CHIGO
CENTRAL AIR-CONDITIONING

CMV MINI VRF System

Control System

3 phase

Technical Support Division
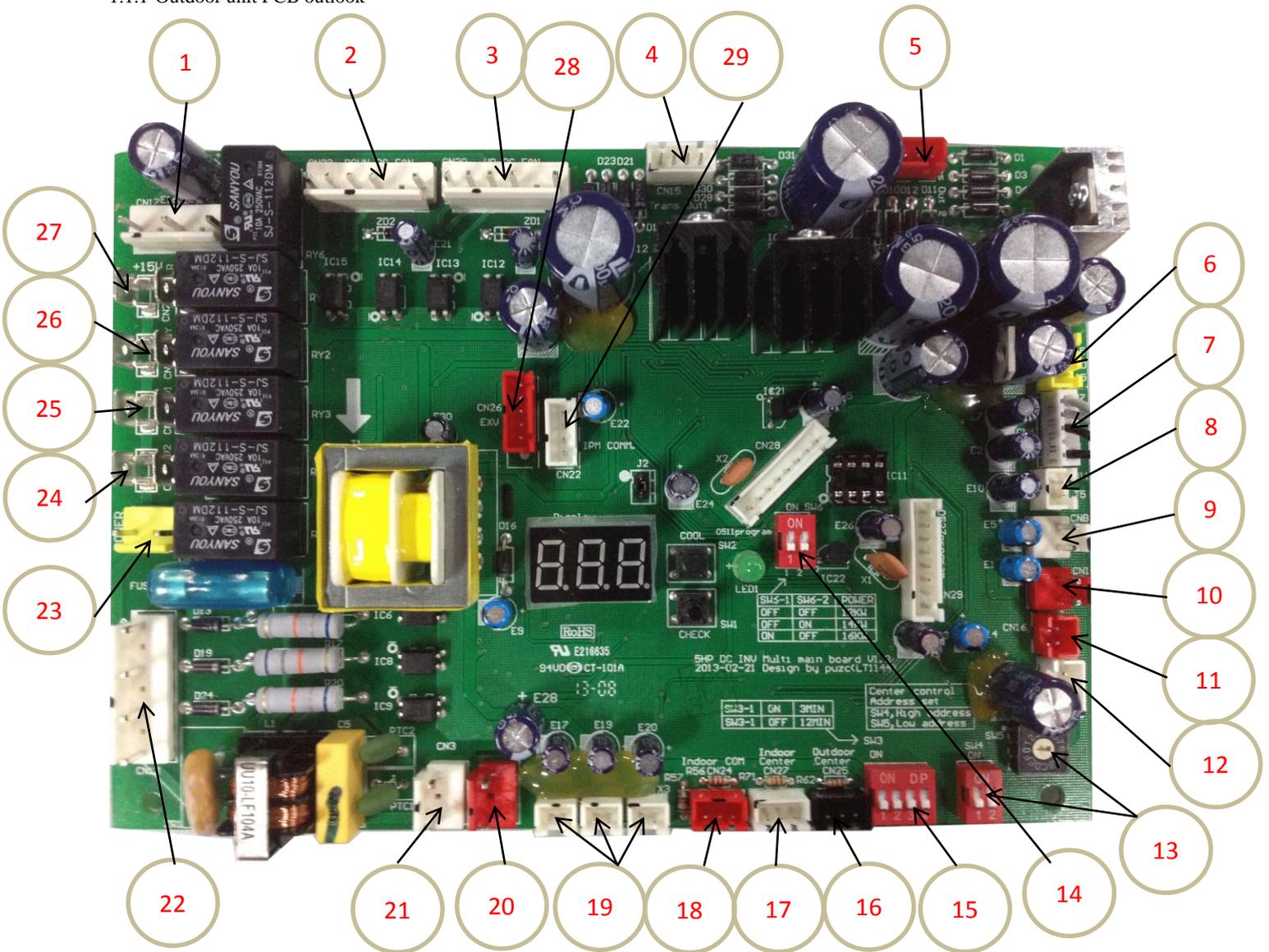
2015.4

Content

CHIGO
CENTRAL AIR-CONDITIONING

1. Outdoor unit and indoor unit PCB

1.1 Outdoor unit main control board.

1.1.1 Outdoor unit PCB outlook

No.	Content	No.	Content
1	Power supply for Fan motor	16	Outdoor unit central control
2	DC Fan Motor(Down)	17	Indoor units central control
3	DC Fan Motor (UP)	18	Communicate with indoor units
4	Transformer Output 1	19	Reserved
5	Transformer Output 2	20	Transformer Input 2
6	Power for 15V.	21	Transformer Input 1
7	Environment and condensate temperature sensor	22	Phase detection
8	Exhaust temperature sensor	23	Power for contractor
9	Low pressure switch	24	Terminal for SV2
10	High pressure switch	25	Reserved
11	Filter board output current detection	26	Terminal for 4-way valve
12	Communicate with PFC (Not used)	27	E-heater for compressor
13	Set the outdoor unit net address	28	Terminal for electrical expansion valve
14	Set the outdoor unit capacity	29	Communicate with IPM board
15	Set the starting time of the unit	/	/

1.1.2 Dial codes definition
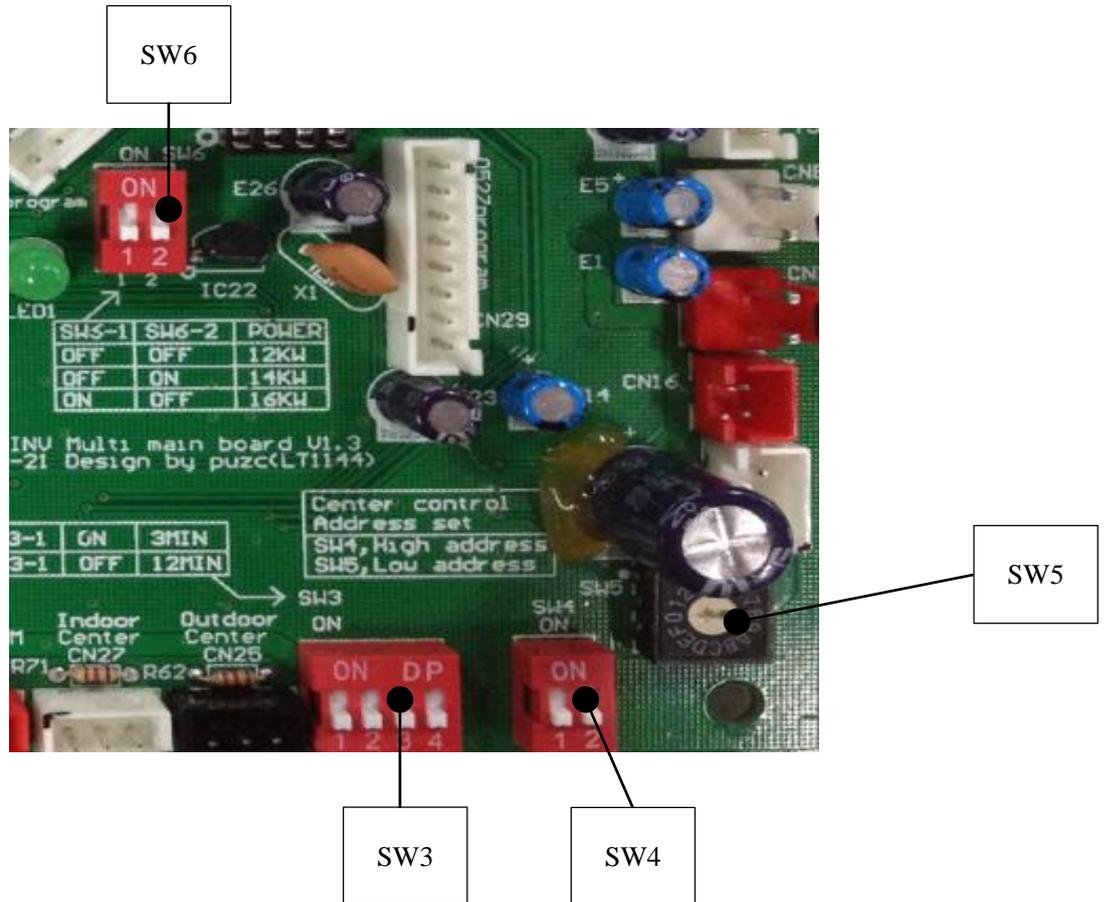
SW3	Start time setting SW3-1(The other 3 switches are reserved)	
Meaning	System can be start only after power on for 12 minutes.	System can be start only after power on for 3 minutes.
Demonstration	OFF 0 (Default setting)	ON 1
Remarks	DO NOT change this setting without professional guidance, or compressor may damge	

SW4 SW5	Outdoor unit net address			
Meaning	00-15	16-31	32-47	48-63
Demonstration				
Remarks	SW4:high order address ;SW5:low order address			

SW6	Outdoor unit capacity setting				
Meaning	10 KW	12.5 KW	14 KW.	16 KW	18 KW
Demonstration	ON DP 1 2 3	ON DP 1 2 3	ON DP 1 2 3	ON DP 1 2 3	ON DP 1 2 3
Remarks	DO NOT change this setting without professional guidance, or compressor may damge.				

SW2: Forced cooling button

1) After pressing it once, all indoor units and outdoor units will start cooling, no matter what mode they are running on, no matter whether they are ON or OFF.

2) The forced cooling function is available for master unit only.

3) During forced cooling mode.
- All indoor EXVs open to 300 pulses.
- All indoor fans are in high speed.
- All compressors are ON.
- All outdoor fan motors are OFF
- Outdoor EXVs opens to 480 pulses

4) When program starts:
- All the compressors are on
- Indoor fan is running at high speed

5) When the process is last for 1h or the button is pressed again, program will quit.

1.1.3 Query procedures.

No.	Display	Content	Remarks
/	- -	Quantity of indoor units which can be communication with outdoor unit	Displays when system standby
/	- -	Inverter compressor frequency	Displays when system is running
1	1 - -	Outdoor unit power	120,140,160,180
2	2 - -	Indoor demand	Display in actual value
3	3 - -	After correction demand	Display in actual value
4	4 - -	Run mode	0:OFF/Fan mode 2:Cooling 3:Heating 4:Forced cooling
5	5 - -	Actually operation ability	Display in actual value
6	6 - -	Wind speed state	0-7
7	7 - -	T2/T2B average	Display in actual value
8	8 - -	T3 outdoor tube temperature	Display in actual value
9	9- -	T4 environment temperature	Display in actual value
10	10 - -	T5 exhaust temperature	Display in actual value
11	11 - -	EXV opening	Actual pulse=Display value x8
12	12 - -	AC current	Display in actual value
13	13 - -	DC current	Display in actual value
14	14 - -	AC voltage	Display in actual value
15	15 - -	DC voltage	Actual value=Display value x4
16	16 - -	How many indoor	Display in actual value
17	17 - -	How many indoor machine is turned on	Display in actual value
18	18 - -	The last time fault	Display 00 if there is no protection.
19	19 - -	---	End

Note:

1) When operation of system lasts 1 hour and stays stability, press checkup button on PCB of outdoor unit, query one by one and fill out the above table according to facts.

2) Description of display:

- *Normal display: when in standby mode, it indicates number of indoor units, when running, it indicates output percentage value of compressor.*

- *Running mode: 0(OFF/fan only); 2(Cooling); 3(Heating); 4(Forced cooling)*

- *Outdoor fan speed range: 0(OFF); 1~7──Speed increasing in turn.*

- *EXV opening: Actual pulse = Display value ×8.*

- *Number of indoor unit: indoor units which are capable of communicating with outdoor unit normally.*

1.1.4 Outdoor error codes.

Code	Malfunction or protection	remark
E1	Phase sequence malfunction	
E2	Communication between outdoor unit and indoor units	
E4	Ambient temperature sensor malfunction	
E6	Outdoor heat condensate temperature sensor malfunction	
E9	AC overvoltage/undervoltage protection	
E10	EEPROM protection	
H0	Communication malfunction between DSP and 0513	
H1	Communication malfunction between 0513 and 0527	
H2	Outdoor unit quantities decreasing malfunction	Only master unit displays
H3	Outdoor unit quantities increasing malfunction	Only master unit displays
H4	There is 3 times P6 protection in 30 minutes.	Repower on to clear the error code.
H5	There is 3 times P2 protection in 30 minutes.	Repower on to clear the error code.
H6	There is 3 times P4 protection in 100 minutes.	Repower on to clear the error code.
H7	Indoor unit quantities decreasing malfunction over 3 minutes	Recover when indoor unit quantity is correct
H9	There is 2 times P9 protection in 10 minutes.	Repower on to clear the error code.
H10	There is 3 times P3 protection in 60 minutes.	Repower on to clear the error code.
H11	There is 2 times P13 protection in 10 minutes.	Repower on to clear the error code.
P1	High pressure protection	
P2	Low pressure protection	
P3	Inverter compressor over current protection	
P4	Discharge temperature sensor protection	
P5	Heat exchanger temperature sensor protection	
P6	Inverter module protection	
P9	Fan module protection	
P10	Protect against typhoons	
P11	T2 high temperature protection in cooling mode.	
P12	Fan continues to work in A zone for 5 minutes in heating mode.	
P13	The current detection abnormal protection.	
L0	Inverter compressor malfunction	
L1	DC generatrix low voltage protection	
L2	DC generatrix high voltage protection	
L4	MCE malfunction/simultaneously/cycle loop	
L5	Zero speed protection	**Error code after P6 protection**
L7	Wrong phase protection	
L8	Speed difference >15Hz protection between the front and the back clock	
L9	Speed difference >15Hz protection between the real and the setting speed	

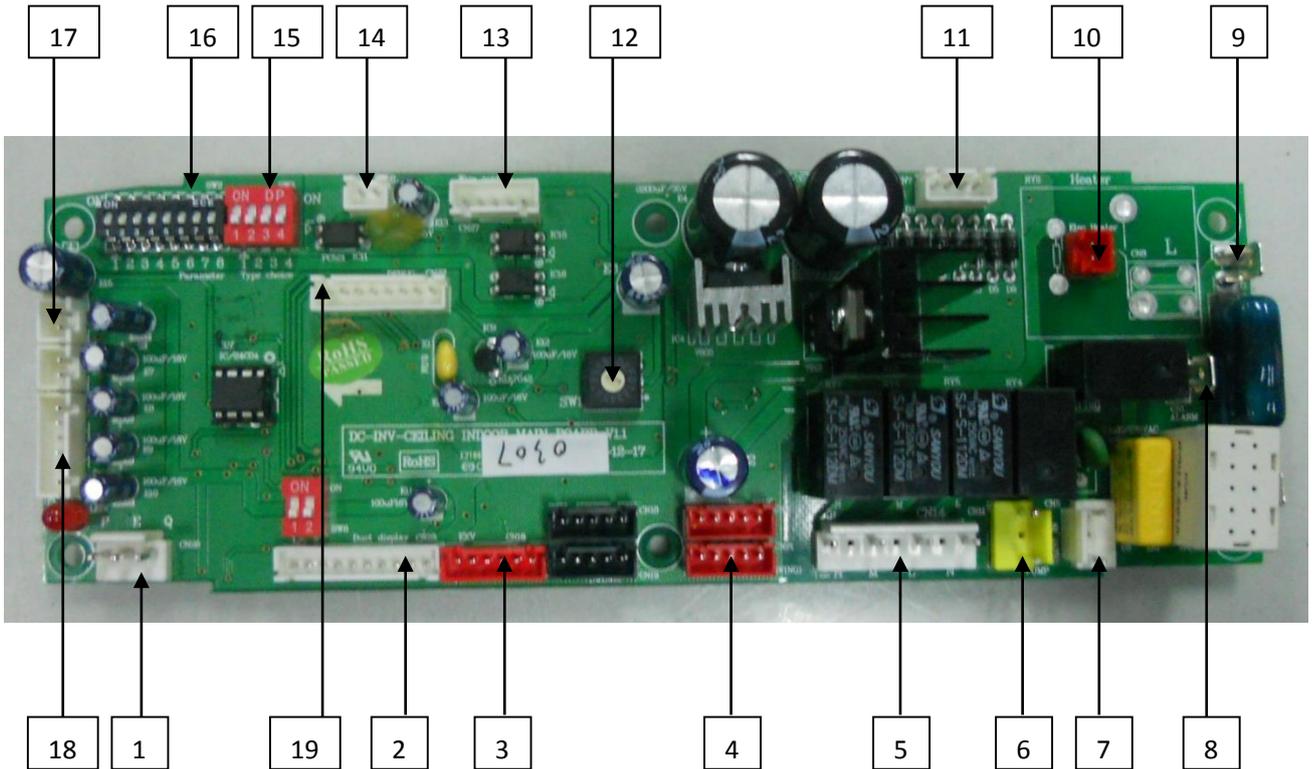1.2   Description of main control board of indoor unit.

1.2.1 There are Five shapes of main control board that used to all types of indoor unit matching with New CMV outdoor unit.
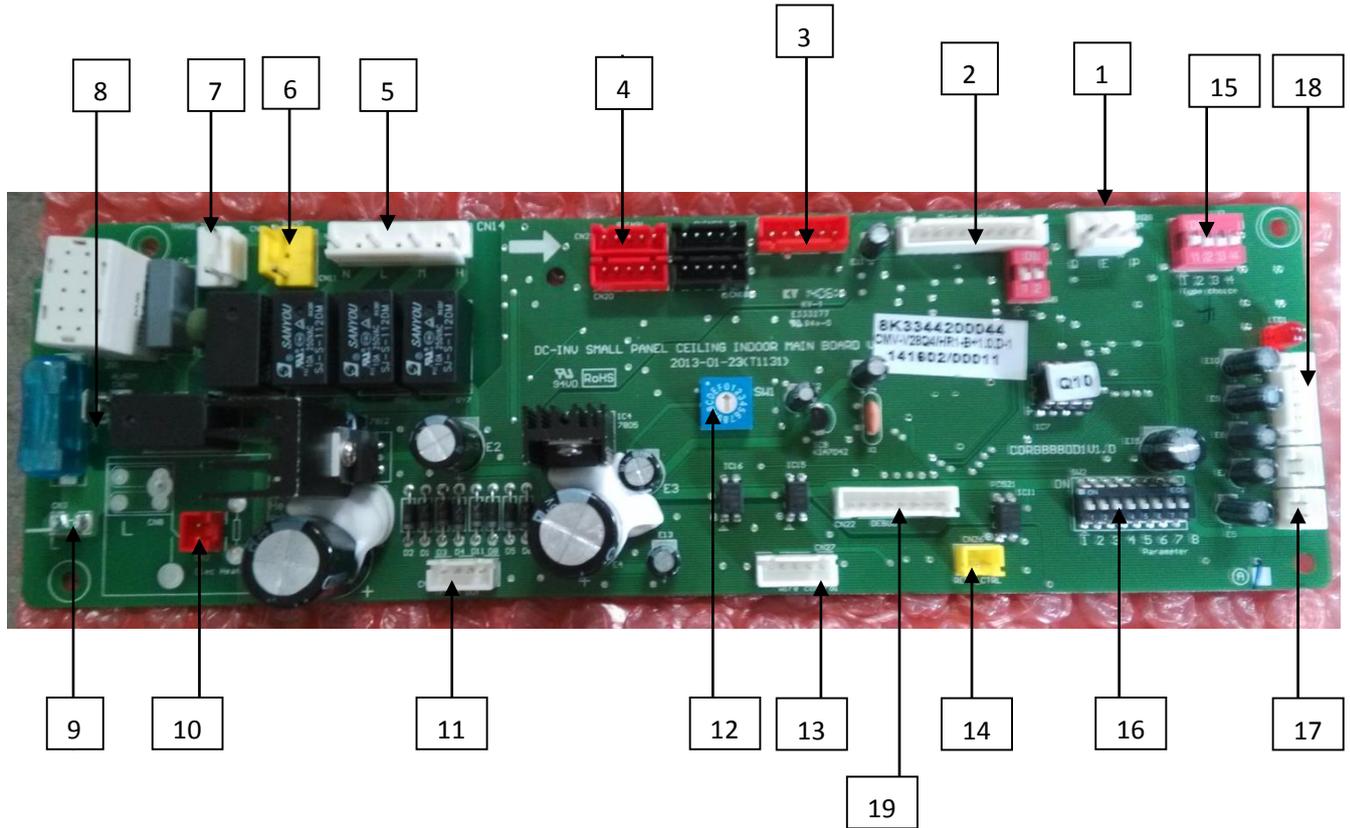
1)   Shape A
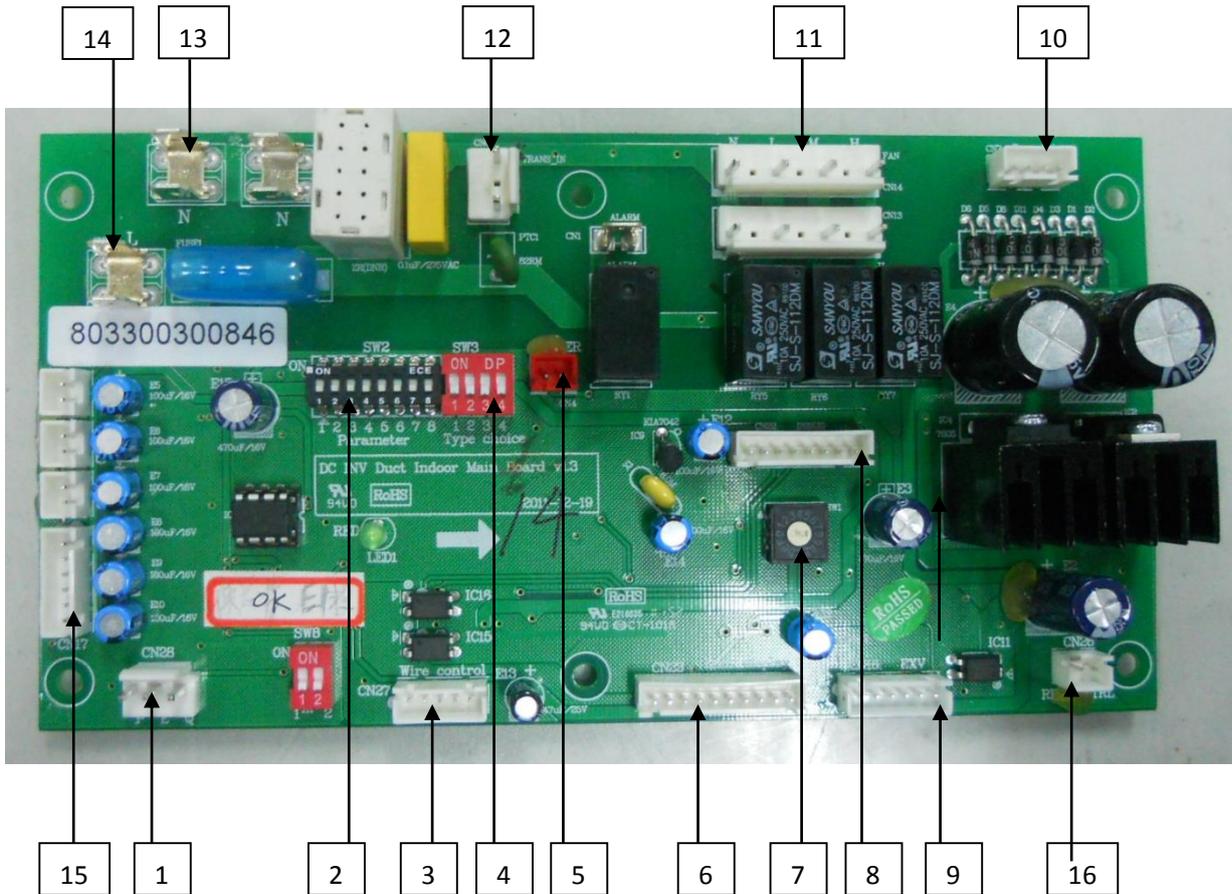
No.	Content	No.	Content
1	Communication port of P Q E	9	EXV activation port
2	SW2	10	Transformer output port
3	Remote control port	11	Fan motor output interface
4	SW3	12	Transformer input port
5	Port for electric auxiliary heater	13	220V AC N interface
6	Port for display board and remote control receiver	14	220V AC L interface
7	SW1	15	Temperature sensor port
8	Download port	16	Remote control switch

CHIGO
CENTRAL AIR-CONDITIONING

2)   Shape B

No.	Content	No.	Content
1	Communication port of P Q E	11	Transformer input port
2	Port for display board and remote control receiver	12	SW1
3	EXV activation port	13	Remote control port
4	Stepper motor control port (a total of 4 port)	14	Remote control switch
5	Fan motor output interface	15	SW3
6	Pump output interface	16	SW2
7	Transformer output port	17	The water level switch interface
8	220V AC N interface	18	Temperature sensor port
9	220V AC L interface	19	Download port
10	Port for electric auxiliary heater	—	

3) Shape C

No.	Content	No.	Content
1	Communication port of P Q E	11	Transformer input port
2	Port for display board and remote control receiver	12	SW1
3	EXV activation port	13	Remote control port
4	Stepper motor control port (a total of 4 port)	14	Remote control switch
5	Fan motor output interface	15	SW3
6	Pump output interface	16	SW2
7	Transformer output port	17	The water level switch interface
8	220V AC N interface	18	Temperature sensor port
9	220V AC L interface	19	Download port
10	Port for electric auxiliary heater	—	

4)   Shape D
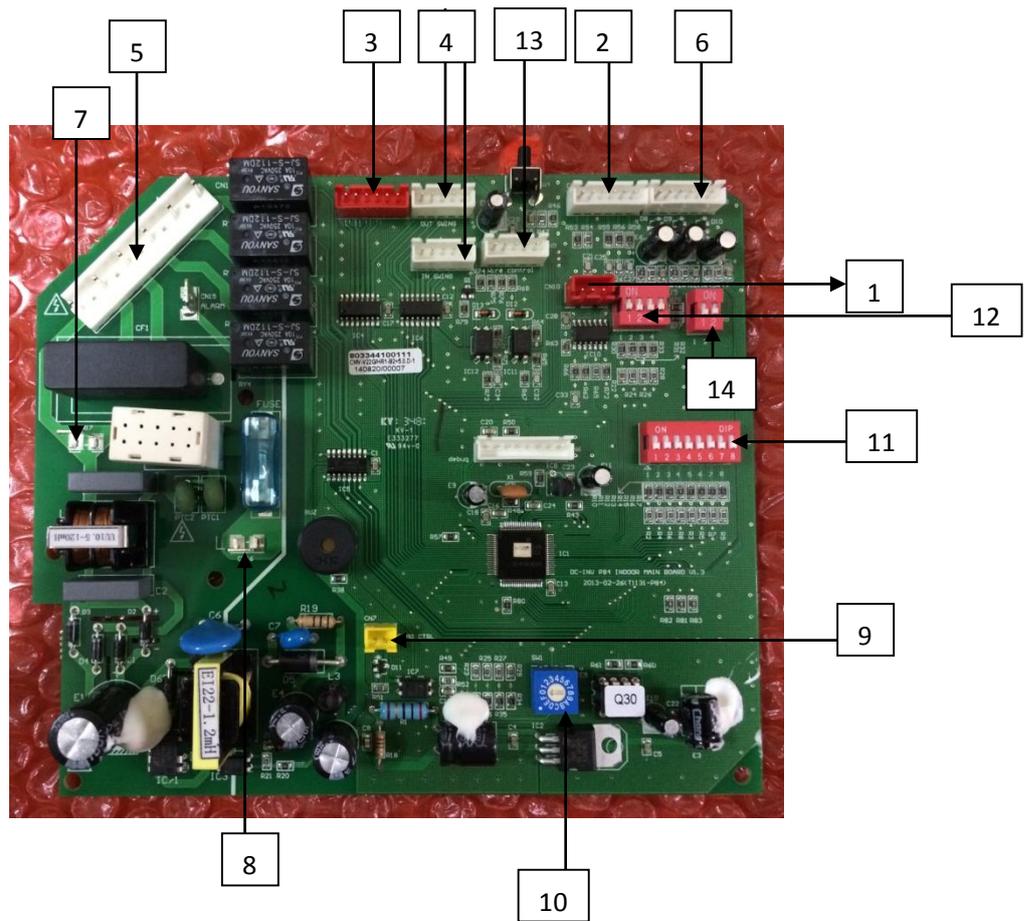
No.	Content	No.	Content
1	Communication port of P Q E	11	SW2
2	Port for display board and remote control receiver	12	SW3
3	EXV activation port	13	Wired control switch
4	Stepper motor control port	14	SW8
5	Fan motor output interface	—	
6	Temperature sensor port	—	
7	220V AC N interface	—	
8	220V AC L interface	—	
9	Remote control port	—	
10	SW1	—	

5)   Shape E

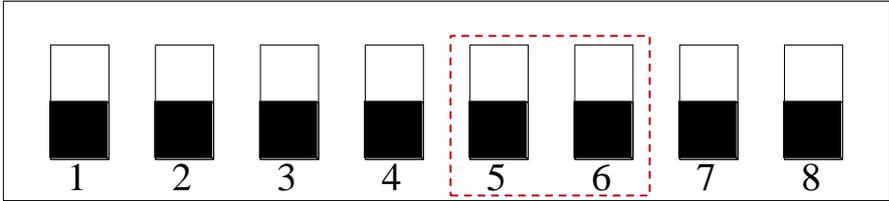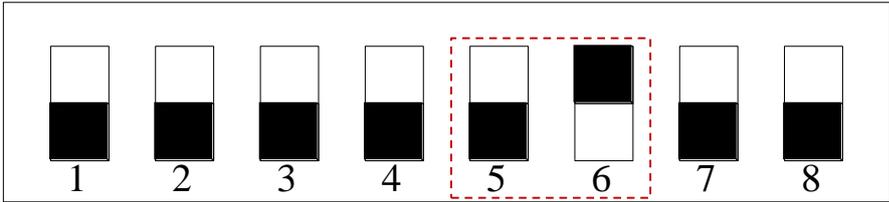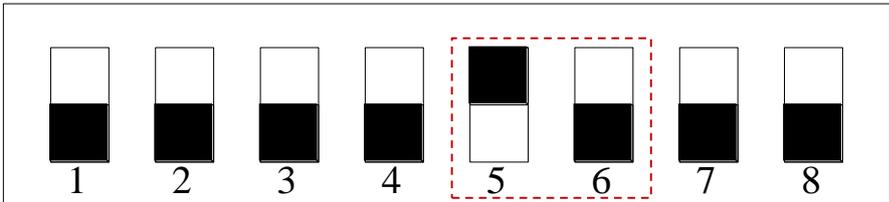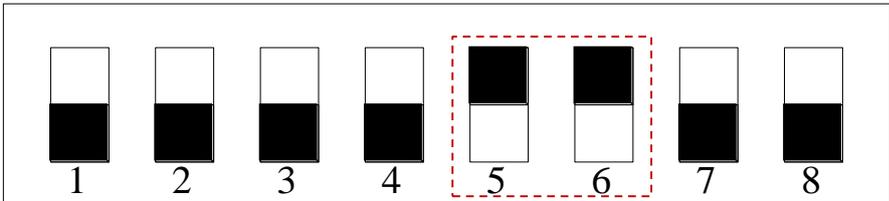| No.	Content	No.	Content
1	Communication port of P Q E	11	SW2
2	Port for display board and remote control receiver	12	SW3
3	EXV activation port	13	Wired control switch
4	Stepper motor control port (a total of 4 port)	14	SW8
5	Fan motor output interface	—	
6	Temperature sensor port	—	
7	220V AC N interface	—	
8	220V AC L interface	—	
9	Remote control port	—	
10	SW1	—	

1.2.2 Error code & meanings

LED display	LED light	Meanings
FE	**TIMER** and **RUN** both flash 4Hz,	No address when indoor unit first time power on
E1	**TIMER** flashes at 4Hz	Communication error between indoor and outdoor units
E2	**RUN** flashes 4Hz	Temperature sensor T1 error
E3	**RUN** flashes 4Hz	Temperature sensor T2 error
E4	**RUN** flashes 4Hz	Temperature sensor T2B error
E5	**ALARM** flashes 0.5Hz,	Outdoor unit error
E6	/	Zero crossing detection error
E7	**DEFOST** flashes 0.5Hz,	EEPROM error
E8	/	Indoor fan motor error
E9	/	Wired controller communication error
EE	**ALARM** flashes 4Hz	Water level alarm error
EF	**DEFOST** flashes 4Hz	Mode conflict

1.2.3 SW2, only available in heating mode.

Name	Switch number 1,2 of SW2	
Function	Reserved	
Setting		Default setting

Name		Switch number 3,4 of SW2	
Function		• Heating temperature compensation value selection. When temperature difference between setting temperature and room temperature is higher than the setting value, indoor fan motor turns off. • DO NOT change the default setting without professional guidance.	
Setting			6 ˚C Default setting
			2 ˚C
			4 ˚C
			8 ˚C

Name	Switch number 5,6 of SW2	
Function	• Temperature selection of turning off fan motor in anti-cold-wind-blow mode. When **indoor heat exchanger temperature** is lower than the setting value, indoor fan motor turns off. • DO NOT change the default setting without professional guidance.	
Setting	ON OFF 1 2 3 4 [5 6] 7 8	15 ℃ Default setting
	ON OFF 1 2 3 4 [5 6] 7 8	20 ℃
	ON OFF 1 2 3 4 [5 6] 7 8	24 ℃
	ON OFF 1 2 3 4 [5 6] 7 8	26 ℃

Name	Switch number 7,8 of SW2	
Function	• Indoor fan motor stopping gap selection in heating mode. • When room temperature gets to (set point + temperature value in Switch number 3,4 of SW2), at this moment indoor unit capacity requirement is 0, indoor fan motor turns off for **4** minutes (this stopping duration time can be changed by below setting). After that indoor fan will run in low speed for 1 minute (this timing is fixed), if indoor unit capacity requirement is still 0, then indoor fan motor keeps off for 4 minutes, and then cycles. • DO NOT change the default setting without professional guidance.	
Setting		4 minutes Default setting
		8 minutes
		12 minutes
		16 minutes
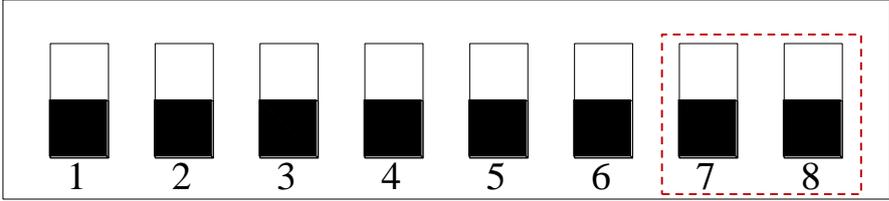
1.2.4 SW8, reserved, leave it as default setting (both switches dial down).

1.3 Electric wiring installations

1.3.1 Highlights of electrical installation

1) Please separately design the special power of indoor units and outdoor units.

2) The power adopts special circuit, and installs circuit breaker and manual switch.

3) The indoor units' power, circuit breaker and manual switch connecting to the same outdoor unit must be general. All indoor units must be the same circuit, and must simultaneously on or off; otherwise, system life will seriously effect, and appear the situation not to solve.

4) The communication line between indoor units and outdoor units please use 3 core shielded wiring, while don't use the multi core wiring without shielded affect, for the interference is reduced each other

5) Purchased wiring, parts and materials should be in compliance with the local and national regulations.

6) All field wiring construction should be finished by qualified electrician.

7) Air conditioning equipment should be grounded according to the relevant local and national electrical regulations.

8) Current leakage protection switch should be installed (select current leakage breaker in light of the 1.5-2 times of total loading rated current.)

9) When connecting wiring and wire holder, use cable clamp to fix and make sure no exposure.

10) Refrigerant piping system and wiring system of indoor and outdoor unit belongs to the different system.

11) Do not connect the power wire to the terminal of signal wire.

12) When power wire is parallel with signal wire, put wires to their own wire tube and remain proper gap (the current capacity of power wire is: 10A below 300mm, 50A below 500mm).

13) Voltage discrepancy of power wire terminal (side of power transformer) and end voltage (side of unit) should be less than 2%. If its length could not be shortened, thicken the power wire. Voltage discrepancy between phases shall not pass 2% rated value and Current discrepancy between highest and lowest phase should be less than 3% rated value.

1.3.2 Selection of wiring

1.3.2.1 The selection of wiring area shall in accordance with the requirements below:

1) Voltage lose of wire shall meet the requirement of terminal voltage for normal operation and startup.

2) The wiring current-carrying capacity determined by installed method and environment is not less than the largest current of unit.

3) Conductor shall ensure the stability of movement and heating.

4) The conductor's smallest sectional area should satisfy the requirement of mechanical strength.

5) When earth protection line (shortly called PE line) is made of material the same as phase line, the smallest sectional area of PE line should be in accordance with the regulation below:

Sectional area of core to phase line (mm²)	Smallest sectional area of PE line(mm²)
S≤16	S
16＜S≤35	16
S＞35	S/2

1.3.2.2 Distribution highlights of distribution wiring

1) When distributing wiring, select wirings with different colors for phase line, zero line and protection earth according to relevant regulations.

2) The power wire and control wire of concealed engineering is prohibited to bind together with refrigerant piping. It is necessary to pass through wire tube and be distributed separately, and the gap between control line and power wire should be 500mm at least.

3) When distributing wiring by passing through pipe, the following should be paid attention to:

- Metal wire tube could be used in indoor and outdoor, but it is not suitable to the place with acid – alkali corrosion.
- Plastic wire tube is generally used in indoor and place with corrosion, but it is not suitable to situation with mechanical damage.
- The wiring through pipe shall not be in the form with ends jointing. If there must be joint, connection box should be

installed at the corresponding place.

- The wiring with different voltage should not pass through the same wire tube.
- Total sectional area of wiring through wire tube shall not exceed 40% valid area of stuffing tube.
- Fixing point of wire tube support shall follow the standard below:

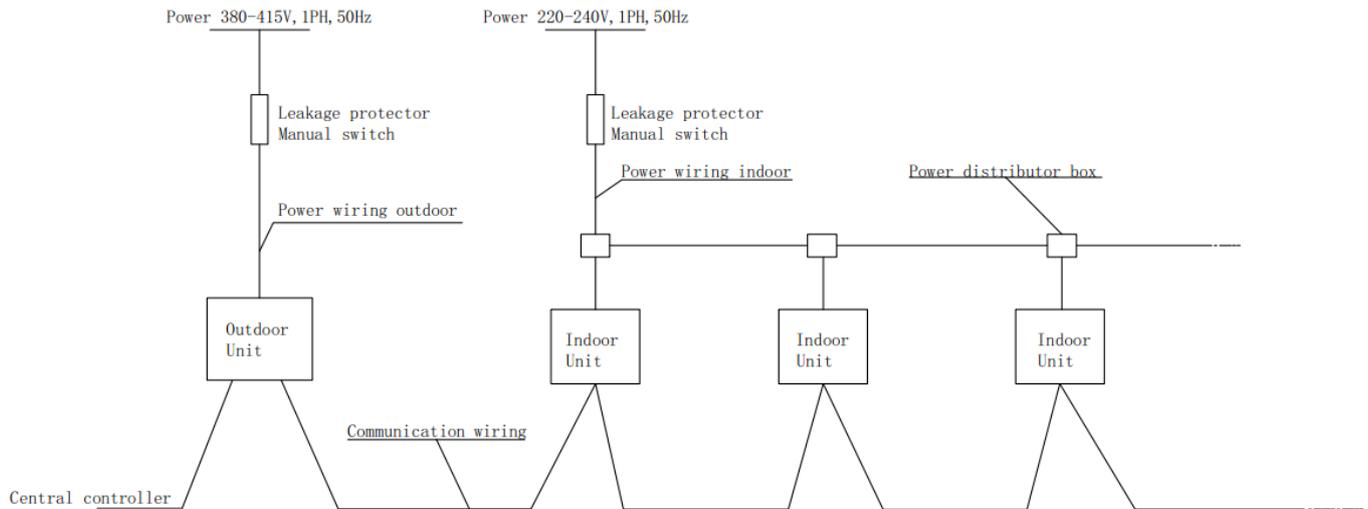| Normal diameter of wire tube (Mm)	Largest gap between fixed points of wire tube	
	Metal pipe	Plastic pipe
15~20	1.5m	1m
25~32	2m	1.5m
40~50	2.5m	2m

1.3.2.3   Outdoor unit power wiring selection

1)   Separate Power Supply without power facility.

Model	Power supply	The shortest wiring diameter (mm^2)			Manual switch (A)		Leakage breaker
		≤20m	≤50m	GND	Capacity	Fuse	
CMV-V100W/ZR1 CMV-V100W/YR1	380-415V 3 Phase 50Hz/60Hz	2.5	6	2.5	25	20	＜100mA，0.1sec
CMV-V125W/ZR1 CMV-V125W/YR1		2.5	6	2.5	25	20	＜100mA，0.1sec
CMV-V140W/ZR1 CMV-V140W/YR1		2.5	6	2.5	25	20	＜100mA，0.1sec
CMV-V160W/ZR1 CMV-V160W/YR1		2.5	6	2.5	25	20	＜100mA，0.1sec
CMV-V180W/ZR1 CMV-V180W/YR1		2.5	6	2.5	25	20	＜100mA，0.1sec

Note: The length in the table equals the value of power cord connecting outdoor units, indicating the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.

2)   With power facilities:

Power 380-415V, 1PH, 50Hz   Power 220-240V, 1PH, 50Hz

Leakage protector   Leakage protector
Manual switch   Manual switch
                                                    Power wiring indoor   Power distributor box
                           Power wiring outdoor

Outdoor   Indoor   Indoor   Indoor
Unit   Unit   Unit   Unit

Communication wiring

Central controller

Note:

● *Select power wire for these five models separately according to relevant standard.*

● *The wiring diameter and the length in the table indicate the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.*
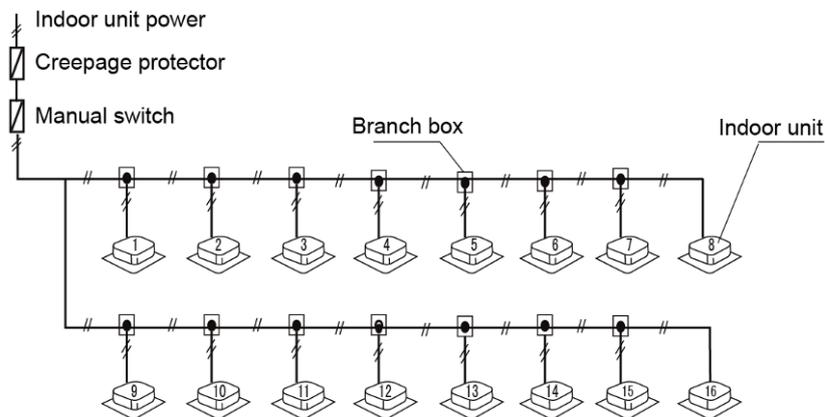
1.5.5 Indoor unit power wiring selection

Indoor unit power
Creepage protector
Manual switch
                                Branch box   Indoor unit

1   2   3   4   5   6   7   8

9   10 11 12 13 14 15 16

Note:

● *Set refrigerant piping system, signal wires between indoor-indoor unit, and that between outdoor-outdoor units into one system.*

● *Please do not put the signal wire and power wire in the same wire tube; keep distance between the two tubes. (Current capacity of power supply: less than 10A--300mm, less than 50A--500mm.)*

● *Make sure to set address of outdoor unit in case of parallel multi-outdoor units.*

2. Communication system

2.1 Control system introduction

2.1.1 Connecting highlights of control line (RS-485 communication)

1. The control line should be shielded wire (wire diameter of the core wire≥0.75 mm^2). Using other wiring shall create signal interference, thus leading to error operation.

2. The shielded nets at the two sides of shielded wires are either grounded to the earth, or connected with each other and jointed to the sheet metal along to the earth.

3. Control wire could not be bound together with refrigerant pipeline and power wire. When power wire and control wire is distributed in parallel form, keep gap between them above 300mm so as to preventing signal interference.

4. Control wire could not form closed loop.

5. Control wire has polarity, so be careful when connecting.

2.1.2 Selection of control wire specification

The ordinary shielded wire includes:

Model	Name
AVP	Copper core PVC insulation shielded wire
AVP-105	Heat-resistant 105˚C PVC insulation shielded wire
RVP	PVC insulation shielded flexible wire
RVP-105	Heat-resistant 105˚C PVC insulation shielded flexible wire
RVVP	PVC insulation shielded PVC sheath flexible wire
RVVP1	PVC insulation entangled shielded PVC sheath flexible wire

2.1.3 Wire of indoor/outdoor units
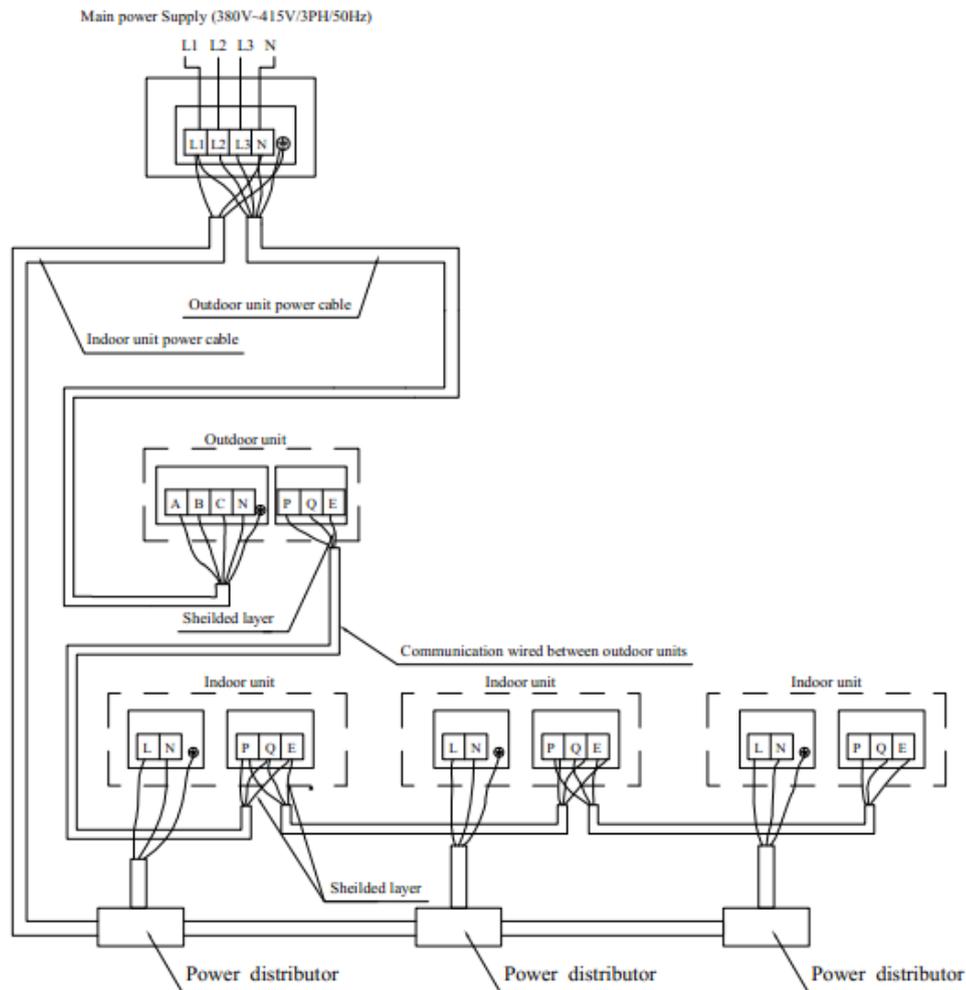
Note:

- *The signal connecting line between outdoor units, indoor and outdoor units and indoor units has polarity. When connecting, be careful to prevent error connection.*
- *Signal line shall adopt three-core shielded wire with an area above 0.75 mm^2.*
- *Do not bind signal line and copper pipe together with belting.*
- *Make sure that the shield metal layer should be grounded well indoor control box in order to prevent interference.*
- *it's forbidden to connect 200V or above high-volt live wire to the communication terminal.*

2.1.4 Correct connection
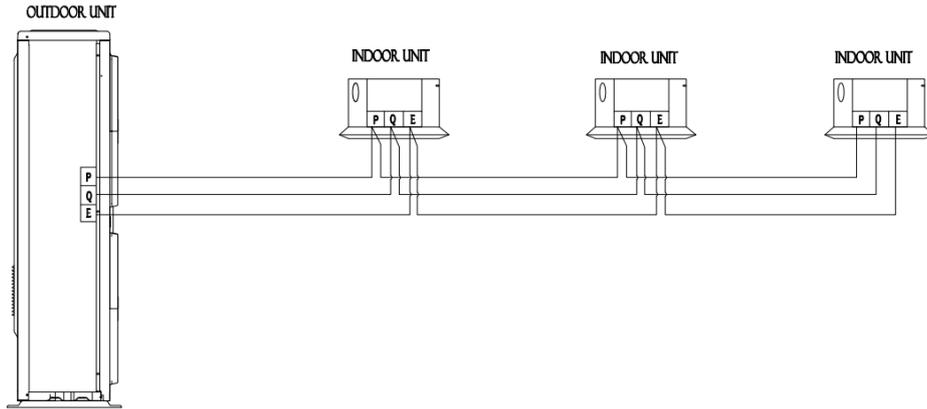
    Note: Shielded layer should be connected to steel pane of electrical control box.

2.1.5 Typical wrong connection

    1)   Loop connection of signal wire
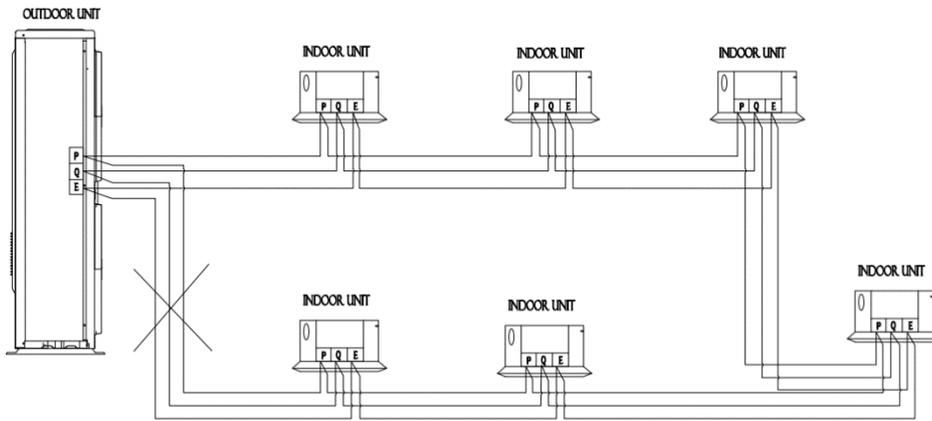
    2)   Star connection of signal wire

        a)   Star connection of part signal wires
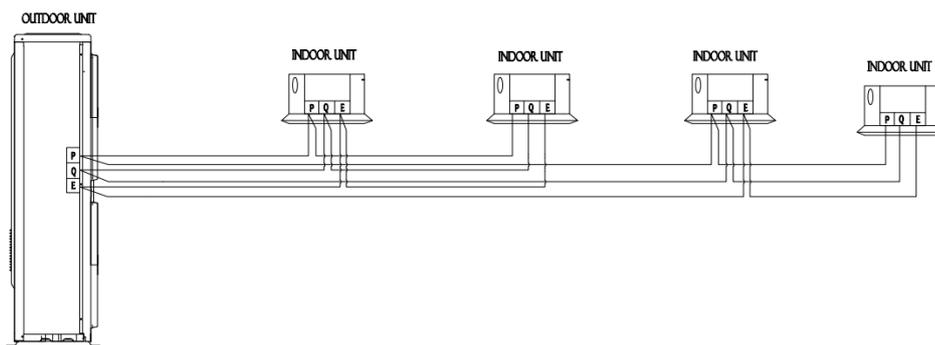
        b)   Star connection of all signal wires

3) Reverse connection of signal wire

    a)   Outdoor unit to indoor unit

IT IS INVERTED.

    b)   Indoor unit to indoor unit

IT IS INVERTED.

3. Controllers

3.1   Wireless remote controller

The model of the following remote controller is Jingling common remote controller
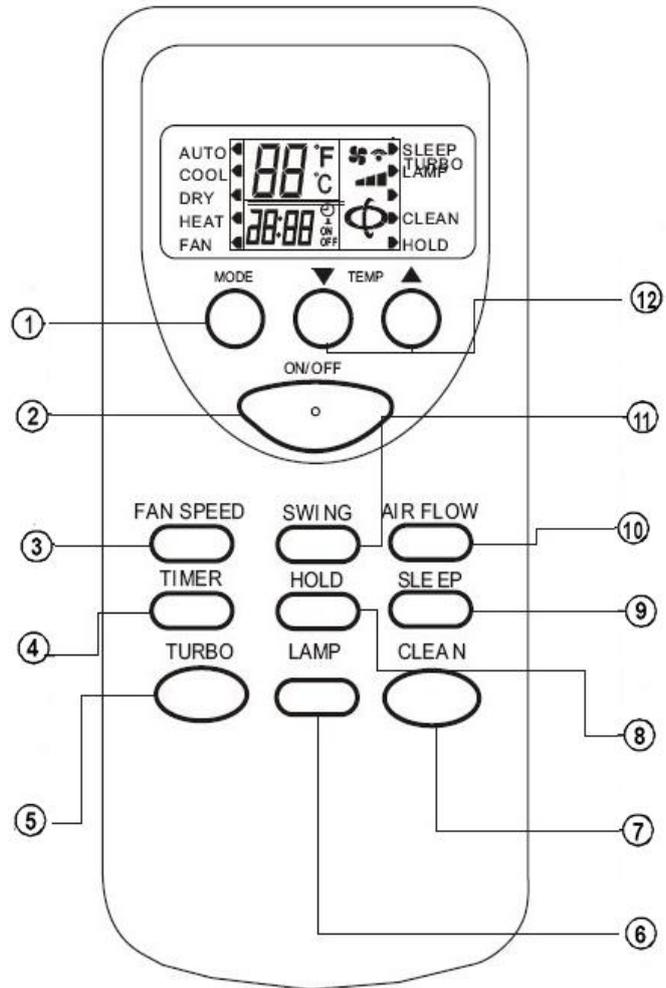
3.1.1 Buttons and functions descriptions

1)   **MODE**: Press the key to switch modes in order: AUTO →COOL →DRY →HEAT →FAN →AUTO

2)   **ON/OFF**: Push this button to turn on the unit. Push the button again to turn off the unit.
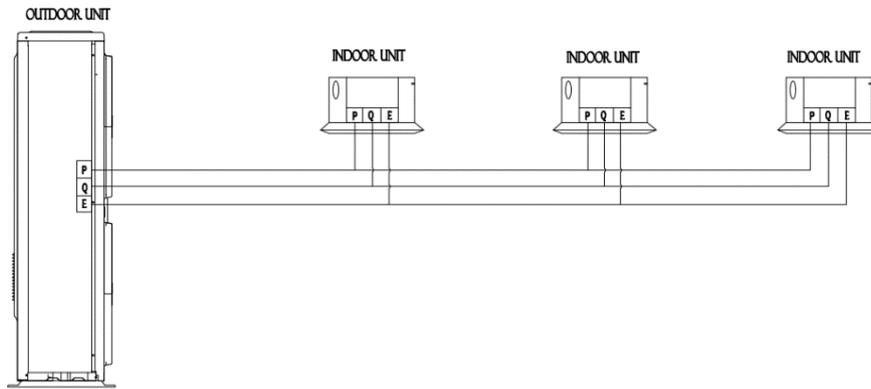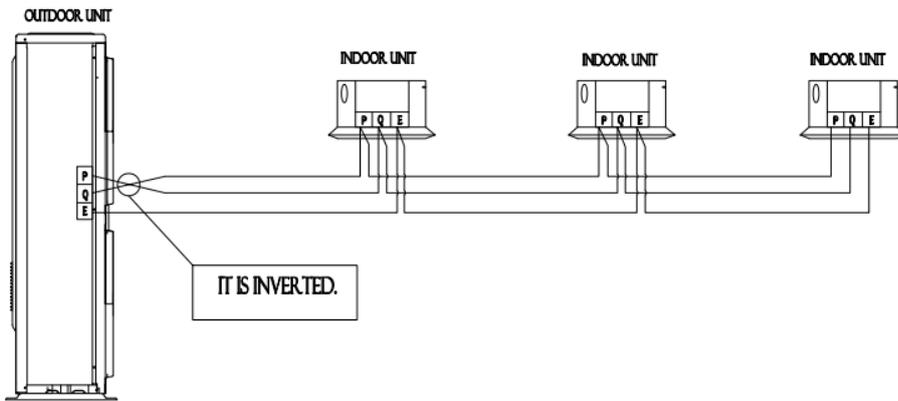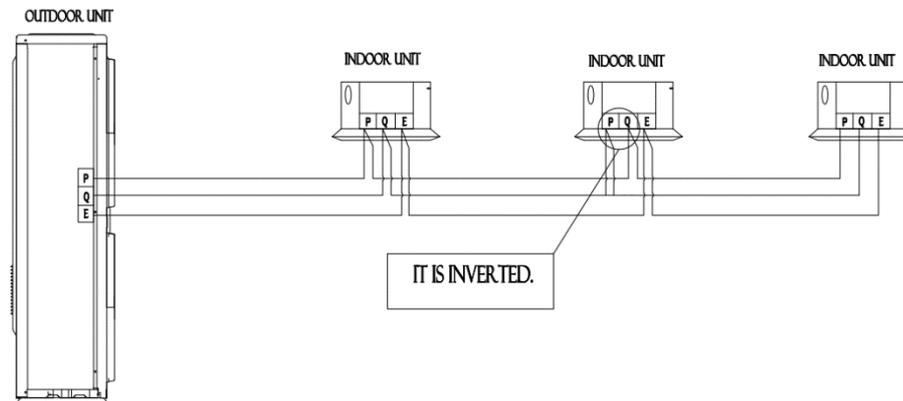
3)   **FAN SPEED**: This button is used for setting fan speed in the sequence that goes from AUTO, LOW, MED to HIGH, then back to AUTO.

4)   **TIMER**: Preset the time ON (start to operate) /the time OFF (turn off the operation) and regards hours as its union

5)   **TURBO**: Reserved

6)   **LAMP**: Used for selecting lamp being on or being off

7)   **CLEAN**: Used for selecting hold purification or canceling purification or canceling purification

8)   **HOLD:** Push this button to select hold mode and canceling hold mode.

9)   **SLEEP**: Push this button to select sleep mode and canceling sleep mode

10)   **AIR FLOW:** Push this button to select swing, stable wind, natural wind and circulating wind

11)   **SWING:** Push this switch button to change the louver angle.

12)   **TEMP:** Push the button to increase the indoor temperature setting or to adjust the TIMER in a clockwise direction.

3.1.2 LCD display indications:
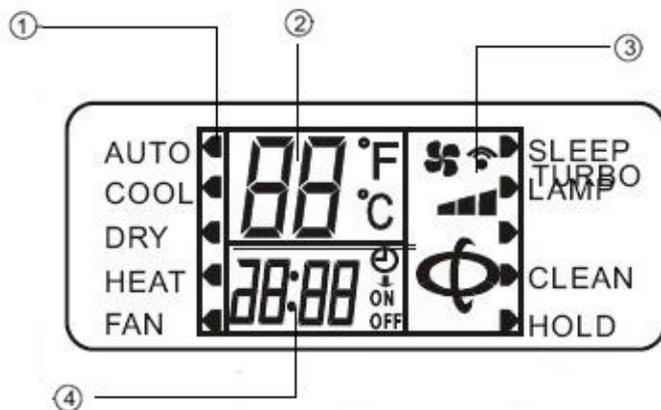
1) AUTO,COOL,DAY,HEAT,FAN display

2) TEMPERATURE Display

3) SLEEP,LAMP,CLEAN,HOLD display

4) TIMER Display

3.2 Wired controller

3.2.1 The remote control board is responsible for the operational status of the system through the control button, through the LCD to display the working status of the whole system, responsible for system control board for communication
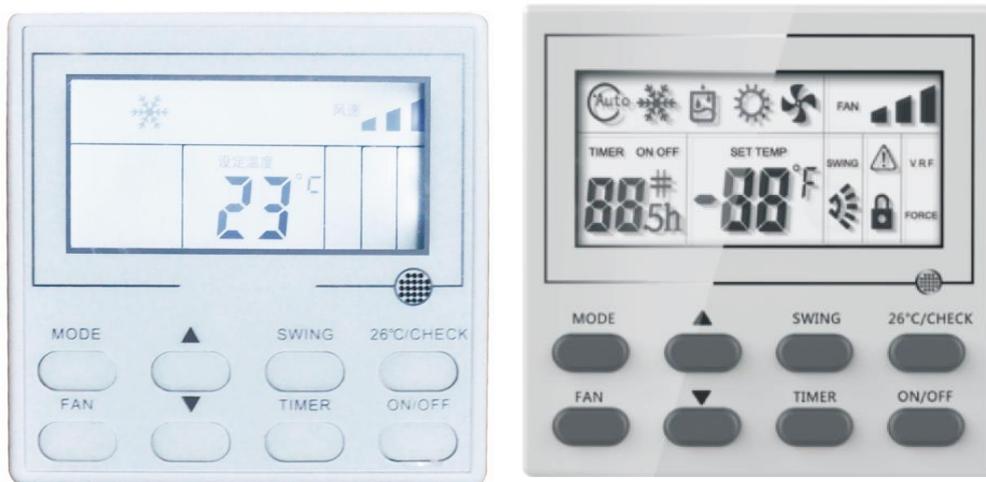
3.2.2 Safety precautions:

1) Please read this safety precaution carefully, before installation. Do observe the following safety precautions, for they are very important.

2) Confirm there is no abnormal phenomenon during test operation after installation completed, then hand the manual to the user.

3) Installation must be conducted by professionals

4) Improper installation may cause electric shock or fire;

5) A random disassembly may cause abnormal operation or heating, which may result in fire.

6) Don't install it in a place where combustible gas easily leaks. Once combustible gas leaks and remains around Controller, fire may be caused.

7) Wire must be suitable for the current of Controller. Otherwise electricity leakage or heating may be caused, which may result in fire.

8) Wire must be suitable for controller, never bring outside force to bear on the terminal. Otherwise wire break or heating may be caused, which may result in fire.

3.2.3 Installation
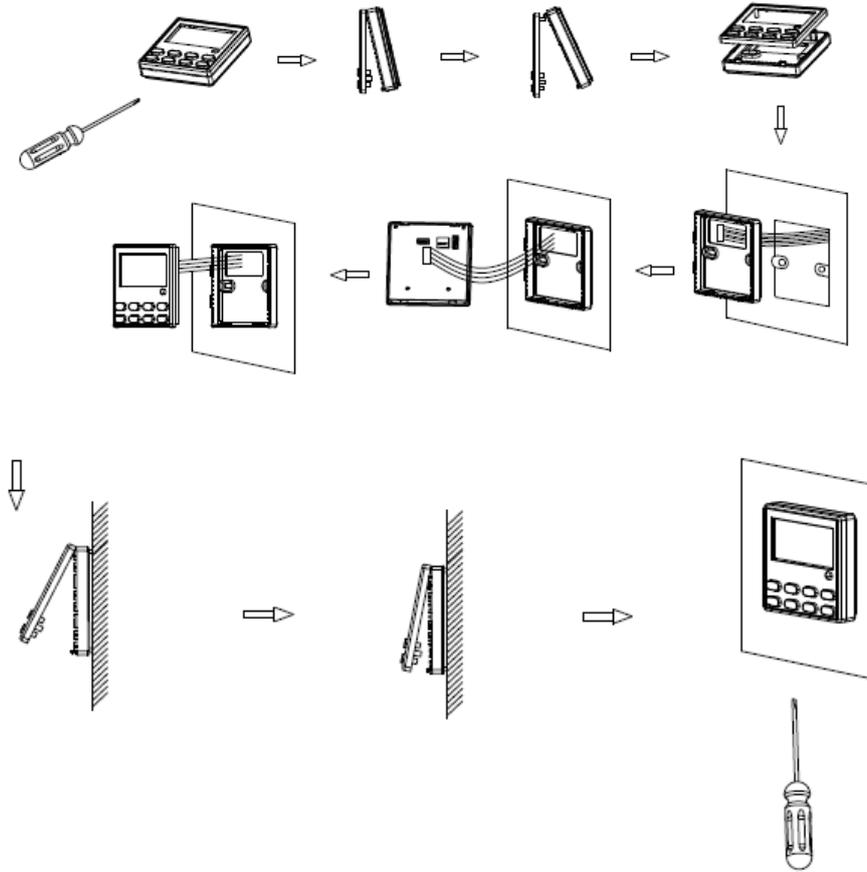
1) Do not install it in a place with oil, steam or sculpture gas, or else deform or malfunction may occur.

2) Wire controller installation notice:

- Please refer to indoor unit installation manual for connecting between wire controller and indoor unit.

- Circuit of wire controller is low voltage circuit. Never connect it with a standard 220V/380V circuit or put it into a same wiring tube with the circuit.

- The shield cable must be connected stable to the ground, or transmission may fail.

- Do not attempt to extend the shield cable by cutting, if it is necessary, use Terminal Connection Block to connect.

- After finishing connection, do not use Mugger to have the insulation check to the signal wire.

Please use the 5-core shielded cable in the attachment. If the total wiring length in the attachment is not long enough, it can be lengthened. However, the overall length shall not exceed 20m.
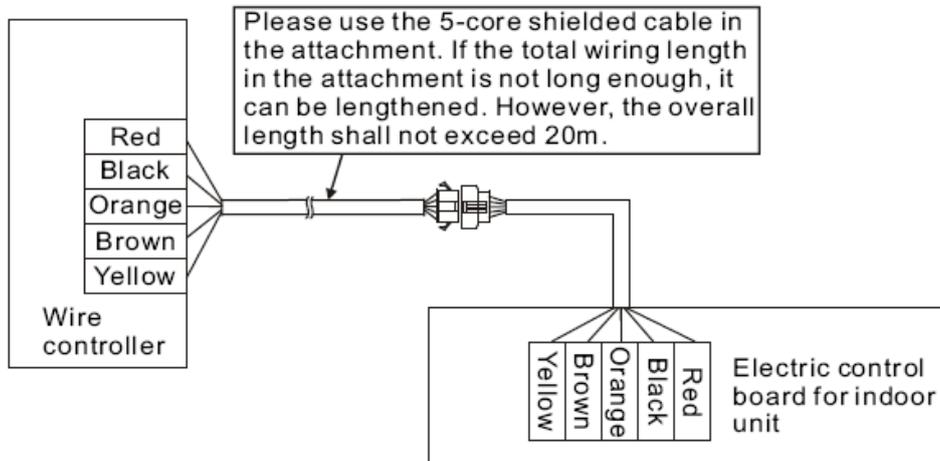
3.3   Address setting remote controller
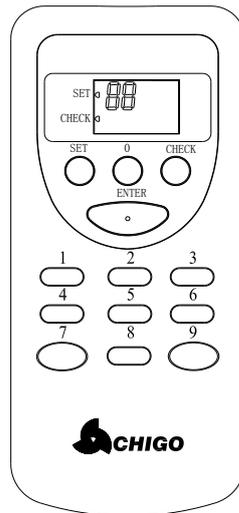
- **SET** key: Press this key to enter the address setting mode.
- **CHECK** key: Press this key to enter the address query mode.
- **Enter** key: Press this key can send the set address or the address query request to indoor unit.
- **Numeric** key: Press these key can set address parameters, it is available only in the address setting mode.

3.3.1 User's instructions

1)   The operation method in the address set mode

- Press the "**SET**" key to enter the address set mode, while the triangle on the right side of the "**SET**" key light, the address parameters display.
- Press a certain numeric pad which corresponding to the tens-digit of a desired setting address parameters, and the tens-digit stop blinking immediately after pressing the key, indicating the completion of a set of tens-digit.
- Press a certain numeric pad again which corresponding to the ones-digit of a desired setting address parameters, and the ones-digit stop blinking immediately after pressing the key, indicating the completion of a set of ones-digit.
- Confirm whether the address of current set is right, and press the " **ENTER** " key of remote controller to send the address parameters to the receiving light panel or wired controller of indoor unit if it is right; if not, press the "**SET**" key to reset address parameters.

2)   The operation method of address query

- Press the "**CHECK**" key and enter the address query mode, the triangle on the right side of "**CHECK**" key lights and the address parameters blinking.
- Set the remote controller towards receiving light panel or wired controller and then press the "**ENTER**" key to send the request to the indoor unit, the plate or wired controller connected to indoor unit will display relevant address parameters.

3.3.2 Notices

1)   Address setting range of parameters must be 0 to 63; otherwise you can't complete the parameters setting.

2)   The methods and instructions of displaying indoor unit's address

- Ducted type indoor unit (with a wired controller): Execute address query operation or press the "**CHECK**" key of wired controller once, the address display area of wired controller will indicate the current address parameters for 5 seconds and then return to normal display.
- Wall-mounted indoor unit (with digital display board): Execute address query operation or press the "**EMERGENT**" key of the indoor electrical control board, digital tube flashes to indicate the current address parameters for 10 seconds and then return to normal display.
- 4-way cassette indoor unit, floor ceiling indoor unit (with 4 LED light board): Execute address query operation or press and hold the "**EMERGENT**" key on the light board for 5 to 10 seconds, according to four different LED display status (off, steady or flashing) and tweet buzzer to indicate the address parameters, the light board return to the normal display and the buzzer resume normal working condition after 10 seconds or loosen the lamp board "**EMERGENT**".

3)   The table of the corresponding relationship between LED type and numeric.

Based on the number and type of LED lights, address parameters is the sum of number the LED corresponding to according to the table below; if the LED is flashing, accumulate and increase 16 is the address of indoor unit; if buzzer tweet at the same time, accumulate and increase 32 is the address of the indoor unit.

LED	Corresponding numeric
Running light	8
Defrosting lamp	4
Timing lamp	2
Warning light	1

4)   The table of the corresponding relationship between address parameters range and the light board & buzzer:

Address	4 LED display	Tweet buzzer
0~15	steady	quiet
16~31	flashing	quiet
32~47	steady	sound
48~63	flashing	sound

3.4   Centralized controller

Centralized controller is a remote wired controller that is used for controlling up to 64 indoor units. Moreover, we could create our AC network with this device, including the PC central monitoring system and the BMS(Building Management System).

- Memory function: It can record the running parameters (mode/fan speed/temp.) when using the controller to turn on the indoor units, all the unit will work as the last setting.
- Automatically record all setting info when lose power
- RS485 communication protocol
- Clear & bright LCD display screen,
- Background light, more parameters display
- Emergency ON/OFF control with simple dry contact input

3.4.1 System configure

1)   With it, we could both centrally control the indoor units and bridge up to 64 indoor units to the PC monitoring software or BMS. In fact, on the purpose of connecting the indoor units to the PC or the gateway, which makes the indoors units visible and can be controlled, it is necessary.

2)   All the indoor units and outdoor units are NEW CMV series, the topology of the network is as follows:
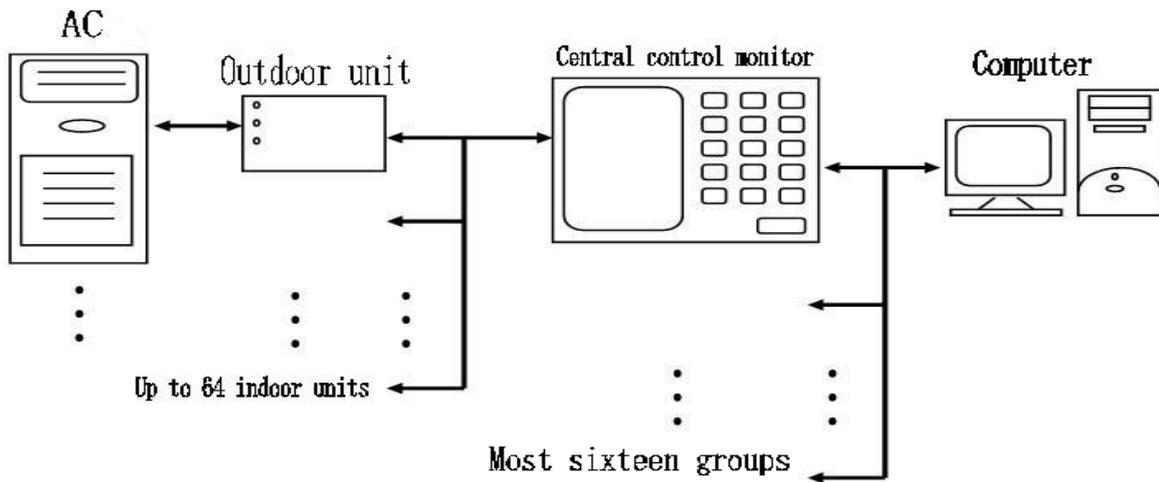
3) For the network topology, either of the connection below is available.
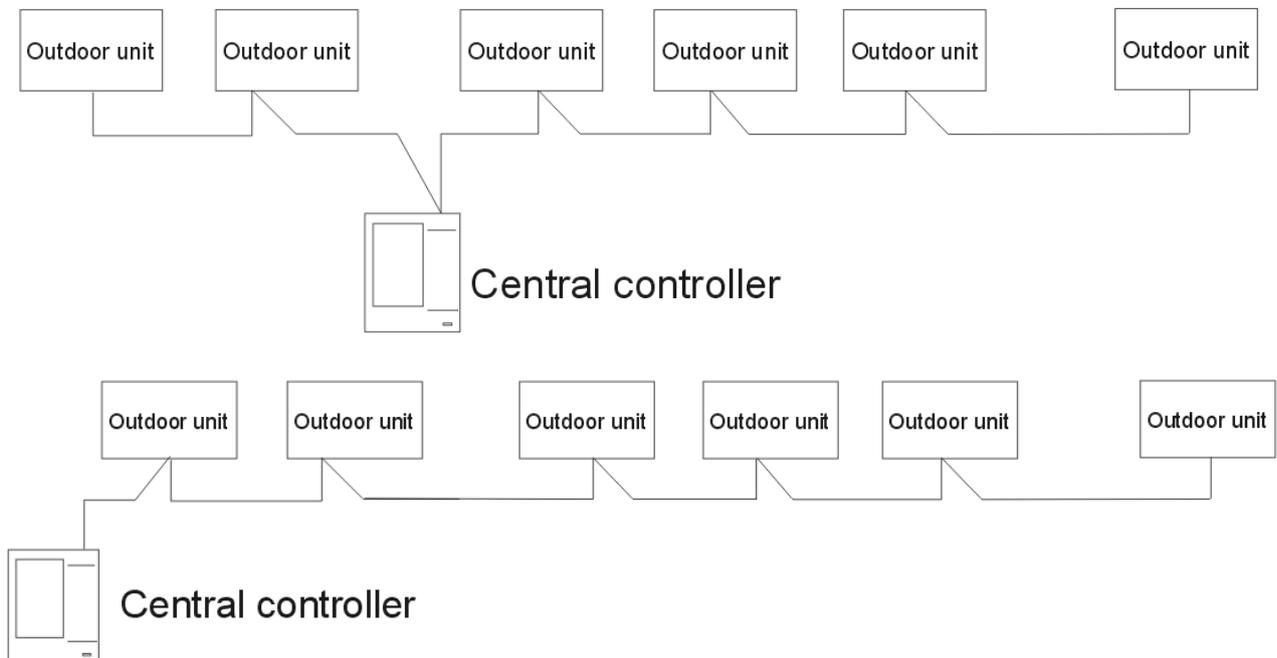
4) To establish a steady network the following should be noted
    ● The signal wire should be 3-core shielded wire and the wire should be provided by licensed electricians.
    ● To make signal transmission steady and to protect the facilities, the signal transmission wires should not be near to the power line. An interval of 300mm-500mm should exist between these two kinds of wires.
    ● The signal wire of each network should be less than 1,200m.
    ● The unit and the centralized controller should be connected hand-in-hand, which means that all the units' same port should be connected to a 3-core wire and the signal wire should be linear in topology. Or else, the facilities could not work normally.
    ●
    ● units' same port should be connected to a 3-core wire and the signal wire should be linear in topology. Or else, the facilities could not work normally.

5)   Structure and composition

Wire Controller Back Cover
Wire Controller Top Cover
Wire Controller LCD
Wire Controller Board
Wire Controller Bottom Cover

Turn a screwdriver at the concave on bottom panel of the Wire Controller to remove the Back Cover

Wood Mounting Screw (M4X20)

When installing the Wire Controller Cover, be sure there is a hole in the wall to avoid the Wire Controller Back Cover being fixed directly to the wall which is not allowed for the Wire Joint extrudes out of the Wire Controller Back Cover

When installing the Wire Controller, you should adjust the bottom of the Wire Controller Board to the Wire Controller Back Cover which should be fixed first, then press the other end of the Wire Controller Board.

3.4.2 Wiring

1)   These 2 ways are both available

●   1st way:

Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit

Central controller

●   2nd way:

Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit   Outdoor unit
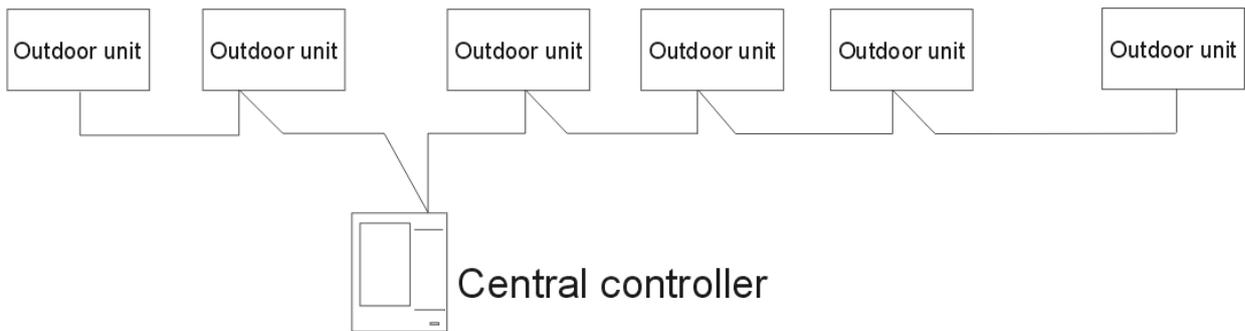
Central controller
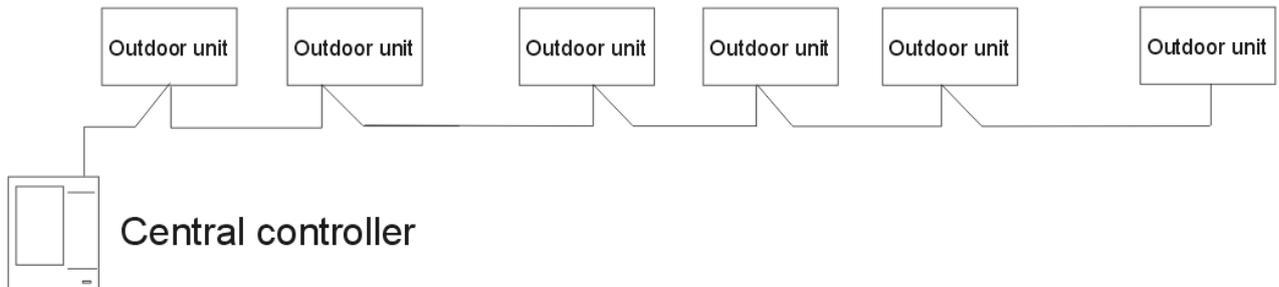
2)   The Centralized controller wiring ports are as follows. F1, F2, E joints are used for PC connection. K1, K2, E joints are used for outdoor unit connections. E joint is the common terminal.

F1 F2 E   K1 K2

Computer communication connecting   Air-conditioner communication connecting
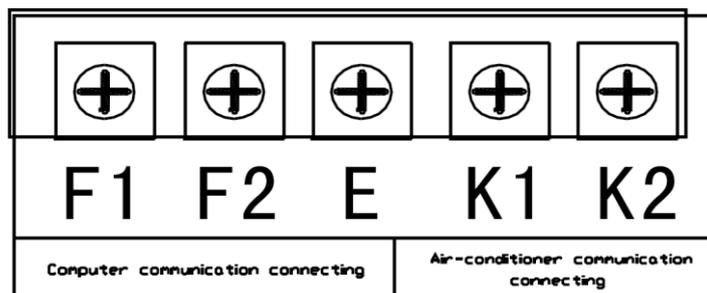
3.4.3 Power supply

It is uses a power adaptor to obtain power supply from the normal AC220V. Remember to connect the adaptor's connector.

Outdoor CCM

Power Transformer
AC220V/AC9.5V

Power Supply Connector
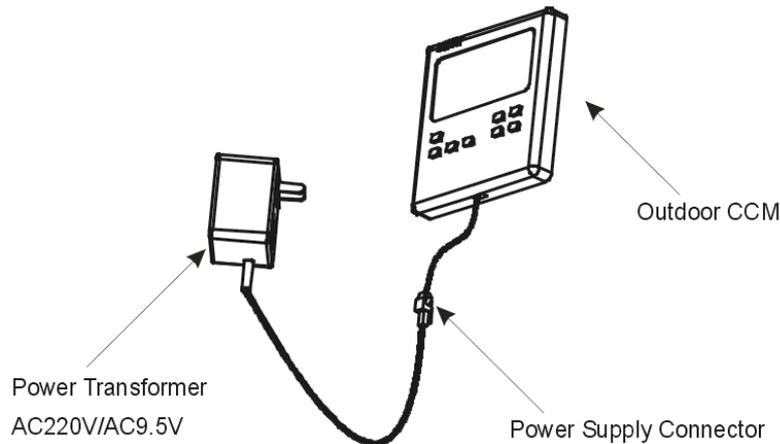
3.4.4 Functions

1. Power-on or reset

After power-on or reset of the centralized controller, at first, the liquid crystal display will have its all display sections lighting up for 2 seconds, in 1 second after all sections have gone out, the system will enter the state of normal display, and the centralized controller will be in the state of the homepage display to show the data of the first page and search the air conditioners online in the network.

2. Centralized controller network area address (reserved)

The local computer or gateway can be connected to 16 centralized controllers at most for communications, and as an area of an air conditioner network, each centralized controller can be distinguished by the centralized controller through dialing to select the corresponding address, with the setting range of 0~ 15.

3. Status indicator

If any air conditioner online in the network has failed, or the centralized controller network itself has any fault, the indicator will flash at the frequency of 2Hz.

If one or more air conditioners online in the network are running, including the timing operation, the indicator will light up and if idle, the indicator will flash at the frequency of 1Hz.

4. Centralized controller lock (reserved)

On receiving the centralized controller locking command sent by the computer, the centralized controller will not allow for switching on or off the air conditioner, as well as any mode setting operation, and at the same time a command will be sent for remote control locking of all air conditioners within the centralized controller network. On receiving the unlocking command, the centralized controller will be actuated to conduct switching-on/off operations, and simultaneously send a command to disable the remote controller locking state of all air conditioners.

The remote control locking state can be locked or unlocked separately by any computer or the centralized controller.

After the monitor has its power cut off, the centralized controller locking state will be memorized, and will not be eliminate after power recovery, unless an unlocking command is received.

5. Mode locking function (reserved)

On receiving the mode locking switching-on/off command, the command is forwarded to the air conditioner, and simultaneously the centralized controller is up set allowing for selection of the startup mode set without any conflict to the locked mode. After the command is received to disable the mode locking, the shutdown state can be free to choose the startup mode.

3.4.5 Button operations

1) **"CHECK"** button

At any time, press the button, and then the operation mode is selected as querying the operation state of the air conditioner. By default, the first online air conditioner will be queried, and you can use the "**ADDR+**" and "**ADDR-**" buttons to change the parameter pages for query, or you can use the "**PAGE UP**" and "**PAGE DOWN**" buttons to change the address for querying other online air conditioners.

2) "**SET**" button

In any other display mode, press this button to enter the setting mode with the default of setting a single unit to display the first online air conditioner. While setting the operation mode, again press this button, and then select to operate all air conditioners in the network, and repeatedly press this button to switch between single settings and full setting.

Single unit ⟶ All units ⟶

3) **"MODE"** button

While setting the operation mode, press this button, and then select to set the air conditioner operation mode as the cooling mode, or heating mode, or air supply mode.

COOLING ⟶ HEATING ⟶ FAN ONLY ⟶ OFF ⟶
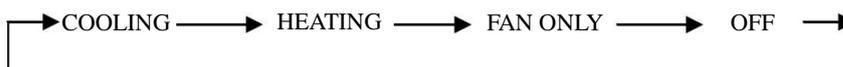
4) **"SPEED"** button

While setting the operation mode, press this button, and then select to set the running mode of the indoor fan as automatic speed adjustment, high speed, medium speed, or low speed.

AUTO ⟶ LOW ⟶ MED ⟶ HIGH ⟶
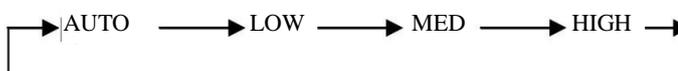
5) **"TIMER"** button

While setting the operation mode, press this button, and then select to set the timer function startup time of the air conditioner; again press this button, and then select to set the timer function shutdown time of the air conditioner; and again press this button to select to quit the timer setting and come back to the normal operation mode.

TIMER ON ⟶ TIMER OFF ⟶ Normal operation ⟶

6) **"SWING"** button

While setting the operation mode, press this button, and then select to enable or disable the swing function, but if all air conditioners currently selected have no swing function or no wind speed status, this button shall be invalid.

7) **"PAGE UP"** button

In the "**CHECK**" mode, once press this button, then it will display the operation status data of the previous air conditioner, and if already at the first unit, then again press this button to display the data of the last unit. If this button is long pressed, then the address will decrease progressively.

In the "**SET**" mode, once press this button, and if the operation targets a single unit, then select the previous air conditioner with an online address number. If it is a full operation mode, this button shall be invalid.

8) **"PAGE DOWN"** button

In the "**CHECK**" mode, once press this button, then it will display the operation status data of the next air conditioner, and if already at the last unit, then again press this button to display the data of the first unit. If this button is long pressed, then the address will increase progressively.

In the "**SET**" mode, once press this button, and if the operation targets a single unit, then select the next air conditioner with an online address number. If it is a full operation mode, this button shall be invalid.

9) **"ADDR+"** button

On the homepage or in the "CHECK" mode, once press this button, then it will display the next page data of the current page, but if already on the last page, then press this button once again to display the data of the first page.

In the "Setting" mode, once press this button, and if it is in the temperature conditioning mode, then the set temperature will increase by 1 degree, but will stop increasing any more up to the highest temperature allowed to be set; if it is the setting mode of timed starting or shutdown time, then select the next time setting, and if there is no timing, it will show 0.0, with the specific changes as follows:

0.0 ⟶ 0.5 ⟶ 1.0 ⟶ 1.5 ⟶ 2.0 ⟶ 2.5 ⟶ 3.0 ⟶ 3.5 ⟶ 4.0 ⟶ 4.5 ⟶ 5.0 ⟶ 5.5 ⟶ 6.0 ⟶ 6.5 ⟶ 7.0 ⟶ 7.5 ⟶ 8.0

⟶ 8.5 ⟶ 9.0 ⟶ 9.5 ⟶ 10 ⟶ 11 ⟶ 12 ⟶ 13 ⟶ 14 ⟶ 15 ⟶ 16 ⟶ 17 ⟶ 18 ⟶ 19 ⟶ 20 ⟶ 21 ⟶ 22 ⟶ 23 ⟶ 24
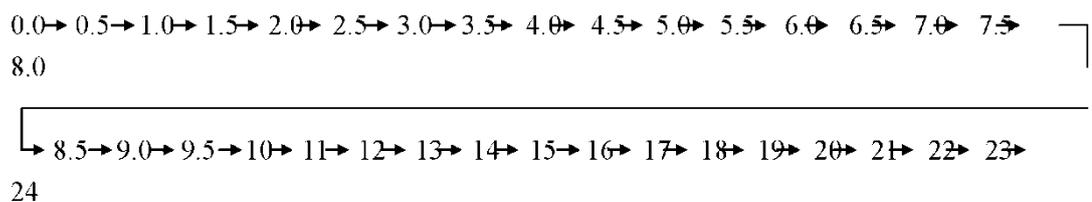
10) **"ADDR-"** button

On the homepage or in the "CHECK" mode, once press this button, then it will display the previous page data of the current page, but if already on the first page, then press this button once again to display the data of the last page.

In the "**SET**" mode, once press this button, and if it is in the temperature conditioning mode, then the set temperature will decrease by 1 degree, but will stop decreasing any more up to the lowest temperature allowed to be set; if it is the setting mode of timed starting or shutdown time, then select the previous time setting, and if there is no timing, it will show 0.0, with the specific changes as follows:

0.0 ⟵ 0.5 ⟵ 1.0 ⟵ 1.5 ⟵ 2.0 ⟵ 2.5 ⟵ 3.0 ⟵ 3.5 ⟵ 4.0 ⟵ 4.5 ⟵ 5.0 ⟵ 5.5 ⟵ 6.0 ⟵ 6.5 ⟵ 7.0 ⟵ 7.5 ⟵

8.0

⟵ 8.5 ⟵ 9.0 ⟵ 9.5 ⟵ 10 ⟵ 11 ⟵ 12 ⟵ 13 ⟵ 14 ⟵ 15 ⟵ 16 ⟵ 17 ⟵ 18 ⟵ 19 ⟵ 20 ⟵ 21 ⟵ 22 ⟵ 23 ⟵ 24
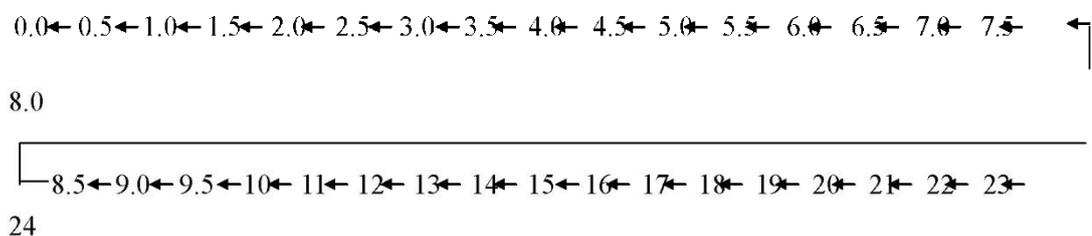
11) **"ON / OFF"** button

At any time, once press this button to complete centralized ON/OFF operation on all air conditioners currently online within the centralized controller network. If all air conditioners online in the network are at the OFF state, then press this button to complete the startup operation; if it is currently on the page for mode setting with the startup mode, temperature, wind speed and other parameters selected, then it will follow the selected parameters for startup; if there is no mode currently selected, but shutdown, or it is currently at other display pages, then it shall be the default startup mode, namely it will be started in the cooling mode and strong wind, with the set temperature of 24℃ and the swing function enabled, the default startup mode will be locked according to the system mode or judged by other restriction conditions; if there is any conflict, it will be automatically adjusted to the next mode without conflict; if all modes are subject to conflicts, the startup will be impossible. If one or more air conditioners online in the network are at the startup mode (including the timing process of timed startup or shutdown), then press the button to complete all shut down operations.

12) `**"MODE LOCK"** button

When in the "SET" mode, depress "MODE LOCK" to lock/unlock the currently selected air-conditioner's running mode. Operating method: if it is selected one to set, the key only works to the air-conditioner of the current address; if the air-conditioner is under mode lock state, unlocking demand will be sent, otherwise locking command will be sent. If "all" is selected, where one or more air-conditioners are currently selected under lock mode, unlocking command will be sent and where all currently selected ones are under unlocking mode, the locking command will be sent. When one air-conditioner is under lock mode, it will be impossible to change its running; if the set mode is not consistent with the lock mode, shut down for processing until mode setting is recovered after unlocking.

13) **"CONFIRM"** button

In the setting mode, press the button to have the mode status and auxiliary functions currently selected sent to the air conditioner already selected.

After the air conditioner has already had its operation mode, auxiliary functions and status information selected, if the "**CONFIRM**" button is not pressed, then the selected information will not be sent to the air conditioner, and the current operation of the air conditioner will not be affected.

You do not need the "**CONFIRM**" button for the remote control locking and unlocking operations, but only need to directly send the command information by pressing the locking button.

14) **"RESET"** button

Press the button at any time, and the centralized controller will reset, with the result identical to that after power-off recovery.

3.4.6 Settings

1) The centralized controller can be set through the panel buttons.

a. Select the "Operation Settings" page, on which you can select the operation target as a single unit or all air conditioners.

b. The operation mode can be selected by means of the "Mode" button, and normally, you can select such modes as cooling, heating and air supply only.

c. When the address is first selected of an air conditioner to be set, if the air conditioner is running, then the default operation mode will display and continue to maintain the setting as the current operating status, but you can select other startup modes by the mode selector button, and use other buttons to select the temperature setting, wind speed and timing, or select to shut down, and the mode selection is subject to mode conflicts and mode locking judgment. If the air conditioner is in its shutdown state, the default should be the status of startup, and the default startup mode parameters should be followed. If the default startup parameters have any conflict with the system line running state in mode, then select the next mode free of conflicts. The startup can not be selected if all startup modes are subject to conflicts (For example, when a single cooler is running in the heating mode).

d. The running fan speed can be selected through the wind speed button, and normally, you can select the automatic wind, strong wind, medium wind and slow wind.

e. The temperature can be set through the temperature control button, with the temperature setting range of 17~30℃.

f. You can select to set the timed startup or shutdown time by means of the timer button, and if the time is set as 0, it indicates there is no timing operation. The first timing operation is set as 0 by default, namely, there is no timing.

g. Enable or disable the swing auxiliary function through the auxiliary function button.

h. Enter the setting page for the first time, and the default should be a single mode. If the air conditioner is in the state of shutdown,

the default startup parameters should be as follows: cooling mode, temperature set as 24℃, high speed and no timing, with the swing function enabled.

i.   At any time, press the ON / OFF button to enable or disable all air conditioners currently online. As long as one of the air conditioner online is running, including running in the state of delay shutdown, press the button, and all online air conditioners will shut down. If all the air conditioners currently online are in the state of shutdown, then the startup command shall be sent as follows: If the button is pressed in the mode of page setting, then follow the currently selected mode, wind speed, set temperature, timing, auxiliary function and other options for startup. If the button is pressed anytime else, with no selected mode setting data and no mode limit, the startup will be enabled by default following the cooling mode, temperature set as 24℃, strong wind and no timing, with the swing function enabled.

2)   Settings through the computer (reserved)

After receipt of the mode information sent from the computer, if there is no mode or function conflict with the selected air conditioner, then the mode setting information is forwarded to the network interface module and air conditioner, with the setting results sent to the computer. If there is any conflict or the mode setting is not successful, then the fault information will be transmitted to the upper computer.

3.4.7 Instructions

Before use of the centralized controller, please confirm that the centralized controlling system has its wiring; address setting for the outdoor unit and centralized controller, and installation of computer monitoring software are in the correct state.

1.   Initial power-on, address setting and state display of the centralized controller

(1) Power-on or reset display state

After power-on or reset of the centralized controller, at first, the liquid crystal display will have its all display sections lighting up for 2 seconds, in 1 second after all sections have gone out, the system will enter the state of normal display, and the centralized controller will be in the state of the homepage display to show the data of the first page. **In case of initial power-on, you must be waiting for 15 seconds before button operations.**

(2). Centralized controller network area address setting (reserved)

The local computer or gateway can be connected to 16 centralized controllers at most for communications, and as an area of an air conditioner network, each centralized controller can be distinguished by code dialing to select the address, with the setting range of 0~ 15.

(3). Status indicator

If any air conditioner online in the network has failed, or the centralized controller network itself has any fault, the indicator will flash at the frequency of 2Hz.

If one or more air conditioners online in the network are running, including the timing operation, the indicator will light up and if idle, the indicator will flash at the frequency of 1Hz.
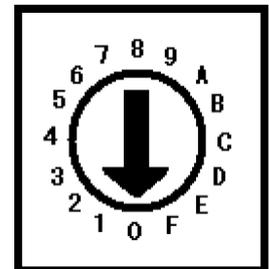
2.   Basic functions of the centralized controller

(1) Network control function of the centralized controller

Control and regulate the status, parameters and on/off state of the indoor units of all air conditioners in the network.

(2). Locking functions of the centralized controller and remote controller

On receiving the centralized controller locking command sent from the computer, the centralized controller does not allow for air conditioner on/off and mode setting operations, and at the same time, all the air conditioners within the centralized controller network will have their remote controllers locked. On receiving the unlocking command, the centralized controller will be actuated to complete on/off operations, and simultaneously send a command to unlock the remote controllers of all air conditioners.

Locking state of remote controllers: The locking or unlocking operations can be completed by an individual computer or you can press the remote controller locking button to complete the locking or unlocking operations (Irrespective of a single indoor unit or several indoor ones, if originally locked, then unlock it; if not locked, then lock it).

(3) Mode locked function (reserved)

On receiving the computer-mode ON/OFF locking command, the air conditioner will be locked to the fixed mode, at the same time, the centralized controller only allows selection of the set starting mode without conflict with the locking mode, and the machines with conflicts between the current operation mode and the locking mode will automatically shut down. On receiving the command to

disable the mode locking, you can be free to choose the starting mode in the shutdown state.

3. Centralized controller query procedures

```
      ┌─────────────────────────────────┐
      │        Standby or running       │
      └─────────────────────────────────┘
                      │
                      ▼
  ┌───────────────────────────────────────────┐
  │ Press the "CHECK" button to inquiry the     │
  │ running state of the first air conditioner  │
  │ by default.                                  │
  └───────────────────────────────────────────┘
                      │
                      ▼
  ┌───────────────────────────────────────────┐
  │ Press the "PAGE UP/DOWN" button to search   │
  │ the running state of other online air       │
  │ conditioners by default.                     │
  └───────────────────────────────────────────┘
                      │
                      ▼
  ┌───────────────────────────────────────────┐
  │ Press the "ADDR+" or "ADDR-" button to      │
  │ search the running state of other online    │
  │ air conditioners by default.                 │
  └───────────────────────────────────────────┘
                      │
                      ▼
  ┌───────────────────────────────────────────┐
  │ Press the "CHECK" button to exit.           │
  └───────────────────────────────────────────┘
```
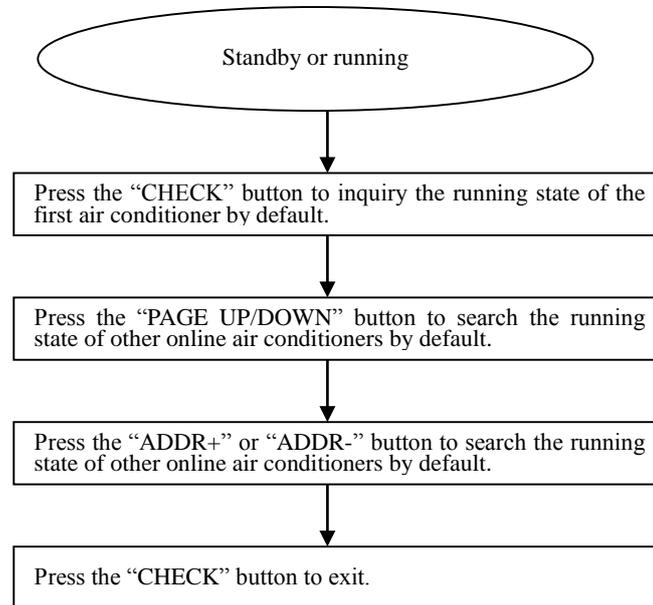
4   Centralized controller ON / OFF operation procedure

At any time, if the ON / OFF button is directly pressed, you can complete the centralized ON / OFF operations on all air conditioners currently online within the centralized controller network to send the parameters and mode currently displayed on the interface to the air conditioner; if necessary, some individual or all air conditioners can be started after such operations as mode and parameter setting are completed. Please refer to the procedure as follows:

Initial power-on, standby or already running

1. Press the "SET" button to enter the state for setting a single air conditioner; and repeatedly press the button to switch between "Single" and "All". If the "Single" button is selected, press the "PAGE UP" or "PAGE DOWN" to select a specific unit.

2. Directly press the "ADDR+" and "ADDR-" buttons to adjust the temperature setting; or press the "Timing" button to enter the state for setting the air conditioner timed on / off or temperature, repeatedly press the button to switch among such three modes as timed startup, timed shutdown and temperature status; after entry into one of the setting states, press the "ADDR+" and "ADDR-" buttons to set the specific parameters.

3. Press the "SPEED" button to set the wind speed of the air conditioner fans, which can be switched among such four modes as automatic speed adjustment, high speed, medium speed, or low speed.

4. Press the "MODE" button to set the operation mode of the air conditioner, which can be switched among such three modes as cooling, heating and fan only.

5. Press the "MODE LOCK" button to lock the mode

Press the "CONFIRM" button to determine the set contents and send to the corresponding air conditioner to start up according to the set contents or change the parameters and mode.

6. Press the "MODE" button to select shutdown.

Press the "CONFIRM" button (continuously) to shut down.

In this operation process, Steps 1, 2, 3, 4, 5 and 6 can be performed separately, but not necessarily in order; after a certain step is set, you can press the "CONFIRM" button to continuously set the next step and then press the "CONFIRM" button; or you can set all the contents or only set a certain step, and then press the "CONFIRM" button. Note: Once you press the "CONFIRM" button, the machine will soon receive the instruction information and operate as required.

3.4.8 2.4.1.7   Important notice

a.   Selection of the mode button - In time of a single-unit operation, if the air conditioner is only a cooler, then the heating mode can not be selected; in time of the full-control mode, as long as there is only one set of cooling and heating air conditioner, then you can select the heating mode, but if there are some single coolers among the air conditioners already selected, it will prompt function conflicts, but the mode setting operations will not be limited.

b.   If the set time is 0, it indicates that there is no timing operation. In time of first entry into the timing operation, the default time is 0, namely, no timing.

c.   Swing auxiliary function – Only if the auxiliary function button selection is enabled or disabled, and as long as one of all air conditioners selected for operations can support the selected auxiliary functions, then this function can be enabled. Otherwise, it can not be enabled. As long as one of all air conditioners selected for operations can not support the auxiliary functions selected as "Enabled", then it will prompt function conflicts, but the mode setting operations will not be limited.

d.   In time of first entry into the setting page, the default mode is a single unit, if the air conditioner is idle, it will follow the cooling mode by default for startup - The temperature is set as 24℃, featuring strong wind and no timing, with the swing function enabled.

e.   At any time, press the ON / OFF button to enable or disable all air conditioners currently online. As long as one of the air conditioner online is running, including running in the state of delay shutdown, press the button, and all online air conditioners will shut down. If all the air conditioners currently online are in the state of shutdown, then the startup command shall be sent as follows: If the button is pressed in the mode of page setting, then follow the currently selected mode, wind speed, set temperature, timing, auxiliary function and other options for startup. If the button is pressed anytime else, with no selected mode setting data, the startup will be enabled by default following the cooling mode, temperature set as 24℃, strong wind and no timing, with the swing function enabled or according to the contents displayed on the current page.

5.3.5.   Communication to the upper computer (reserved)

Once receiving the data sent to the local address from the upper computer, it will enter the network control state, but if not for 1 consecutive minute, it will exit from the network control state. If the data communication has produced frame errors or data check errors, then it will result in communication fault between the centralized controller and the computer, with the fault code of "03#", and the fault will be removed after the communication has become normal or exited from the network control state.

3.4.9 Table for faults and protection codes

Code	Fault Contents	Code	Protection Contents
Air conditioner faults and protection			
EF	Other faults	PF	Other protections
EE	Water level detection fault	PE	Reserved
ED	Outdoor unit fault protection	PD	Reserved
EC	Fresh fault (reserved)	PC	Reserved
EB	Frequency conversion module protection (reserved)	PB	Reserved
EA	Compressor overflow (four times) (reserved)	PA	Reserved
E9	Main board and display board communication fault	P9	Reserved
E8	Wind speed detection runaway (reserved)	P8	Compressor overflow
E7	EEPROM error (reserved)	P7	Power supply overvoltage and under voltage protection
E6	Zero crossing detection fault (reserved)	P6	Exhaust low pressure protection
E5	T3 sensor fault or T4 or digital compressor discharge temperature sensor fault (reserved)	P5	Exhaust high pressure protection
E4	T2B sensor fault	P4	Exhaust pipe temperature protection
E3	T2A sensor fault	P3	Compressor temperature protection
E2	T1 sensor fault	P2	Condenser high temperature protection
E1	Indoor and outdoor communication fault (reserved)	P1	Anti-cold wind or defrosting protection
E0	Phase sequence error or phase missing (reserved)	P0	Evaporator temperature protection
Network fault			
03#	Communication fault between the centralized controller and the computer (gateway)		
02#	Communication fault between the centralized controller and the function module		
01#	Communication fault between the centralized controller and the network interface module		
00#	Communication fault between the network interface module and the main control panel		