



Central modbus controller ME30-24/E4(M)


Owner's Manual


Commercial Air Conditioners

- Thank you for choosing Commercial Air Conditioners, please read this owner's manual carefully before operation and retain it for future reference.

User Notices

Please read this manual carefully before installation and operation and strictly observe the installation and operation instructions covered in this manual. In addition, careful attention shall be drawn to the following two symbols.

 WARNING
It indicates, if operated improperly, it would lead to bodily injury or severe damage.
① The installation shall be done by the skilled serviceman; otherwise it would lead to a fire hazard or electric shock.
② Be sure the power plug is inserted into the socket only after it is dried and cleaned.
③ Do not touch the gateway before its power supply is cut off.
④ Do not touch the gateway with wet hands; otherwise it would lead to electric shock.
⑤ Do use the properly sized power cable. A fire hazard would happen when the connection or installation is in poor condition.
⑥ Be sure the power supply is connected in the correct sequence and the power supply is within the rated range, otherwise it would lead to a fire hazard or even the gateway would be damaged.
⑦ Place the gateway inside an indoor electric cabinet which is inaccessible and locked.
⑧ Do not locate the gateway where it would be subject to electromagnetic interference or dust.

 CAUTION
It indicates, if operated improperly, the equipment would be damaged.
① Be sure proper power supply is provided, otherwise the gateway will fail to work or even be damaged.
② Be sure all devices are placed correctly, otherwise communication would go abnormally.
③ Be sure the communication line is connected to the correct port, otherwise communication would go abnormally.
④ The connected communication line should be protected with the insulating tape against oxidation and short circuit.
⑤ Normal working conditions: 1) temperature: -20~+70°C; 2) humidity: ≤85%; 3) installation location: inside an indoor electric cabinet, not subject to direct sunlight, rain and snow etc.

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1 General

Modbus gateways for the central air conditioning system are used to bridge the internal network of the air conditioning system (CANbus) and the monitoring network (Modbus). It will provide the web-based remote monitoring and control system/BMS communication interfaces and is enabled to take the real-time monitoring and the long-distance control to the air conditioning system. Also, it will provide the Modbus RTU protocol, five digital inputs and five digital outputs, among which the DI1 is defined for the fire alarm input (when the fire alarm signal is input, the Modbus gateway will stop the air conditioning system immediately).

This gateway is applicable to VRF5 DC inverter system.



2 Check before Installation

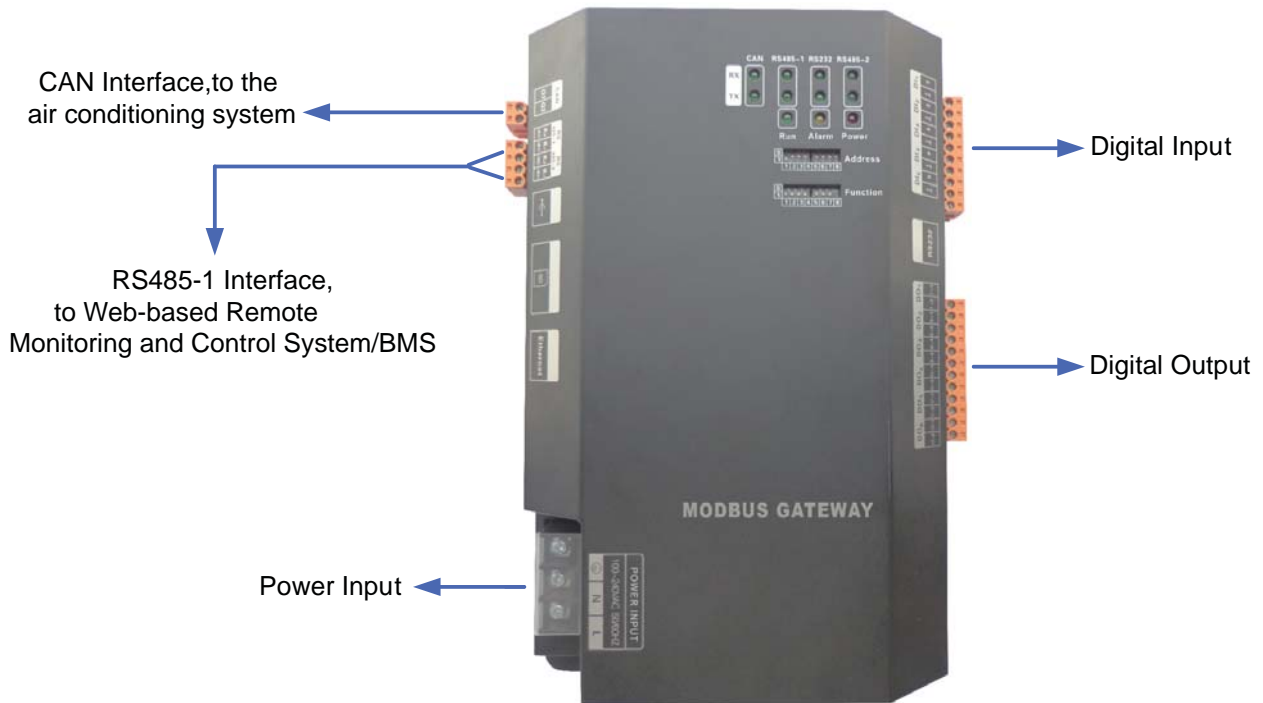
Please check for the items listed below prior to installation.

Modbus Gateway	1
Installation and Operation Manual	1

3 Structural Description

3.1 Interfaces

3.1.1 Interface Drawing



3.1.2 Power Supply Interfaces



The power input should be 100VAC-240VAC, 50/60Hz.



WARNING

Do not touch the input port of the power supply when the gateway is energized.

3.1.3 Communication Interfaces



CAN Interface: it is connected to the air conditioning system through twisted pairs so as to get through the communication between the Modbus gateway and the air conditioning system.

RS485-1 Interface: It is connected to Web-based Remote Monitoring and Control System/BMS through twisted pairs so as to get through the communication between the Modbus gateway and the Web-based Remote Monitoring and Control System/BMS.

RS485-2 Interface: it is reserved .

3.1.4 Digital Inputs and Outputs



This gateway supports five DIs (digital inputs) and five DOs (digital outputs). There is another reserved digital output DO 6.

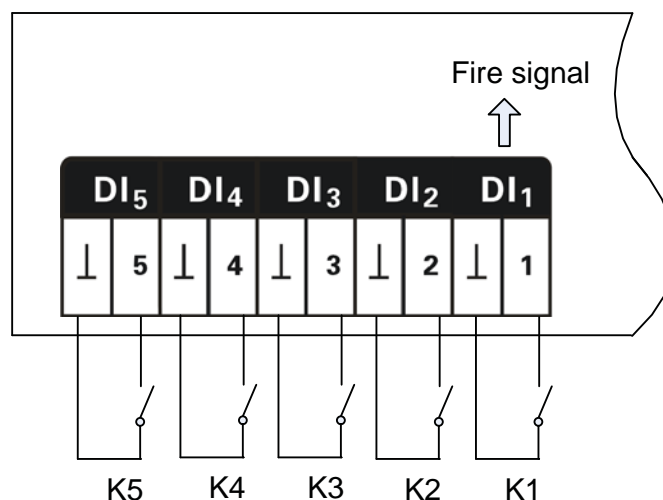
DI1...DI5

Digital inputs: binary (0/1) digital signals, applicable to passive inputs.

DI 1: it is defined for the fire alarm input. When K1 is short circuited, DI 1 will input the binary signal “1”, which indicates that the Modbus gateway will stop the whole air conditioning system at once. When K1 is opened, DI 1 will input the binary signal “0”, which indicates the whole system will resume the normal operation.

DI2...DI5: they will be defined by the user.

E.g.: when K5 is closed, DI 5 will input the binary signal “1” and input the binary signal “0” when it is opened.

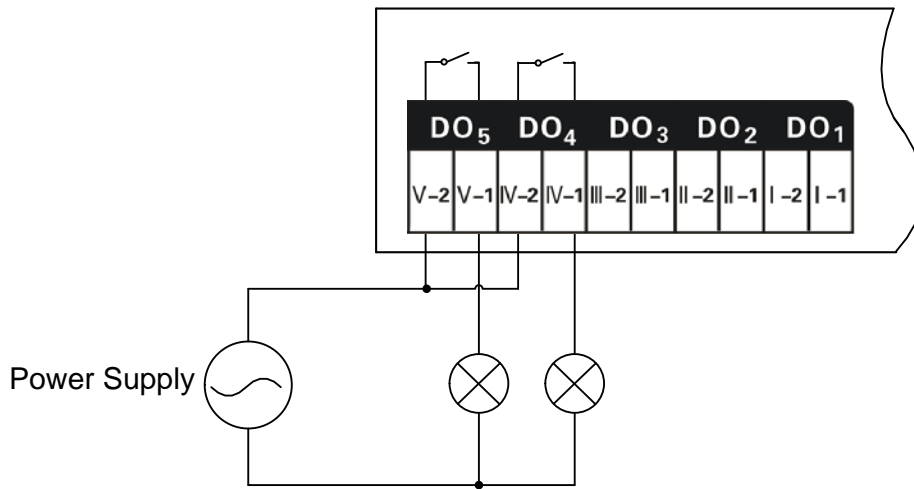


DO1...DO5

Digital outputs: relay outputs, normally open contacts.

Maximum allowable power: 250VAC,3A; 30VDC,3A

E.g.: when DO 5 is input the binary signal “1”, its two contacts will be closed; when DO 5 is input the binary signal “0”, its two contacts will be opened.



3.2 Indicating LED

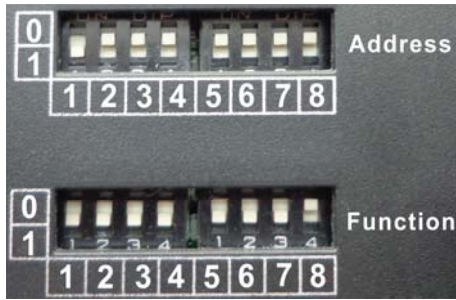


CAN	RX	It flashes when the gateway receives data from the target equipment (like, the air conditioning system).
	TX	It flashes when data is communicated to the target equipment (like, the air conditioning system).
RS485-1	RX	It flashes when the gateway receives data from the monitoring PC or BMS.
	TX	It flashes when data is communicated to the monitoring PC or BMS.
RS232	RX	It is reserved.
	TX	It is reserved.
RS485-2	RX	It is reserved.
	TX	It is reserved.
POWER		It lights on when the Modbus gateway is powered normally.
RUN		It flashes when the Modbus gateway is in normal operation.
ALARM		It is reserved.

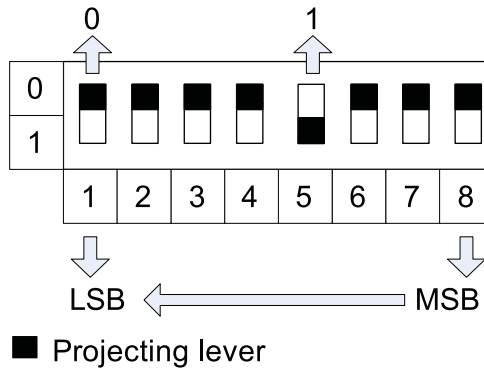
3.3 DIP Switches

 CAUTION
The DIP switches shall be set prior to operation of the gateway.

This Modbus gateway includes two kinds of DIP switches, address DIP switch and function DIP switch.



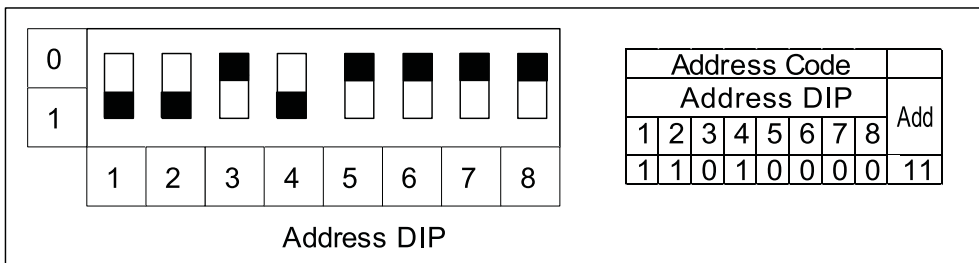
3.3.1 Structural Drawing of the DIP Switches



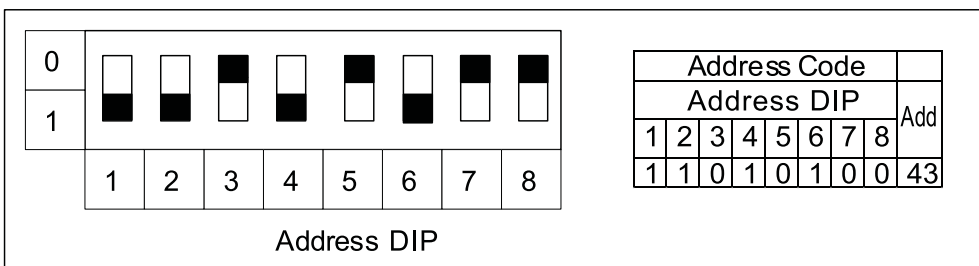
3.3.2 Address DIP Switch

The address DIP switch is intended to set the address of the Modbus gateway, which should be done prior to any operation of this gateway. The DIP address is ranging from 1~255. The DIP address of the same Modbus bus is not allowed to be repeated, otherwise communication would fail.

How to Set Address 11:



How to Set Address 43:



3.3.3 Function DIP Switch-CAN2 Bus Matched Resistance Setting

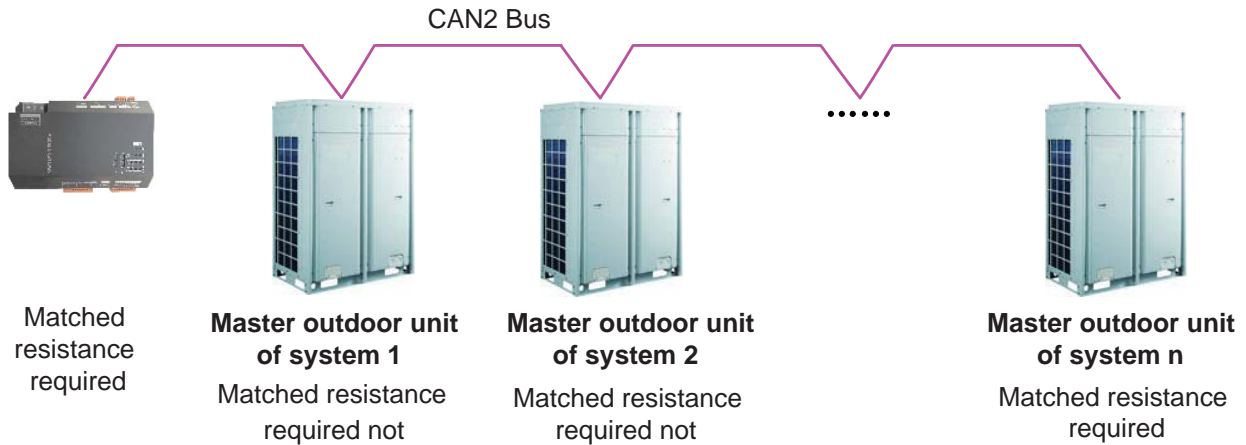


The master outdoor unit of air conditioning system or the gateway located at either end of the CAN2 bus (see the topological drawing in Section 4.3) should include a matched resistance; otherwise the normal communication would fail.

The eighth position of this function DIP switch is used to set the matched resistance of the CAN2 bus.

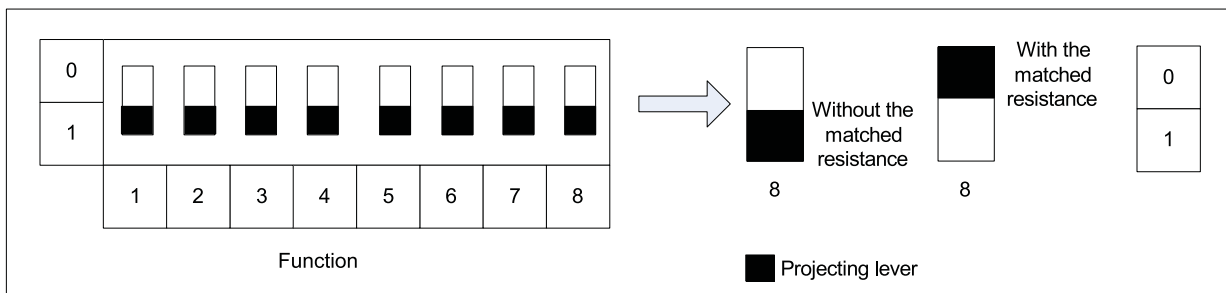
When the Modbus gateway is located at either end of the CAN2 bus, it shall be coupled with a matched resistance and the eighth position should be set to “0”.

When the Modbus gateway is located at neither end of the CAN2 bus, no matched resistance is required the eighth position should be set to “1”.



“n” (n≤16) represents the quantity of the air conditioning systems.

How to Set the Matched Resistance:



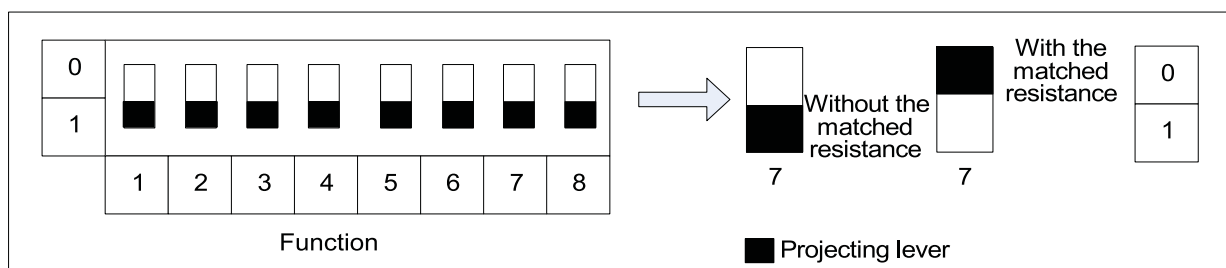
3.3.4 Function DIP Switch-RS485 Bus Matched Resistance Setting

The seventh position of this function DIP switch is used to set the matched resistance for the RS485 bus (herein, it is the Modbus bus)

The RS485 bus should be terminated with a matched resistance to avoid signal reflex along the transmission line.

In application of the Modbus gateway, an upper unit as the terminal unit is usually coupled with a RS485 matched resistance, so this gateway is factory defaulted to be without a matched resistance.

When the Modbus gateway is required to be set with a matched resistance, the seventh position of this DIP switch should be set to "0" and the gateway should be located at the end of the RS485 bus.



3.3.5 Function DIP Switch-First Indoor Unit No. Setting

As shown in the topological air conditioning network in Section 4.3, each indoor unit has an identification number.

The sixth position of the function DIP switch is intended to set the first indoor unit number which is used to define the range of the indoor units under the control of the gateway.

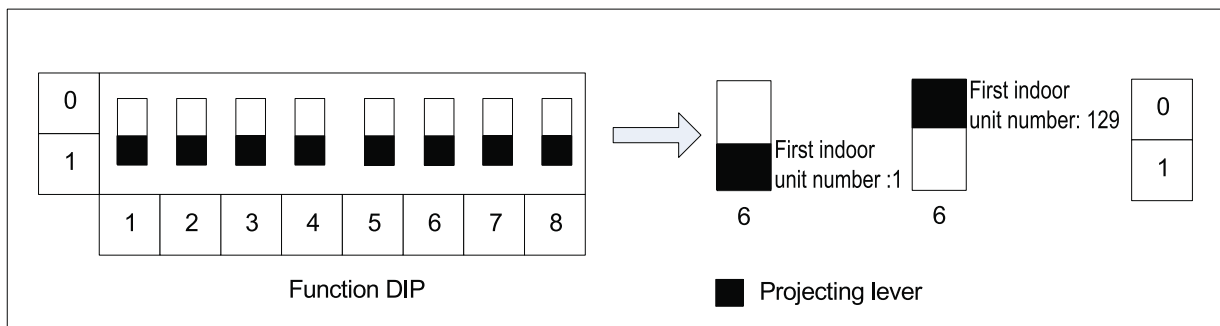
The number of indoor units ranges from 1 to 255.

When the first indoor unit number is set to “1”, it indicates the range of the indoor units under the control of the gateway is 1 through 128.

When the first indoor unit number is set to “129”, it indicates the range of the indoor units under the control of the gateway is 129 through 255.

When the indoor unit number is beyond the range defined by the gateway, it should be modified.

How to Set the First Indoor Unit Number:



4 Applications

The Modbus gateway is generally applied in the following two systems.

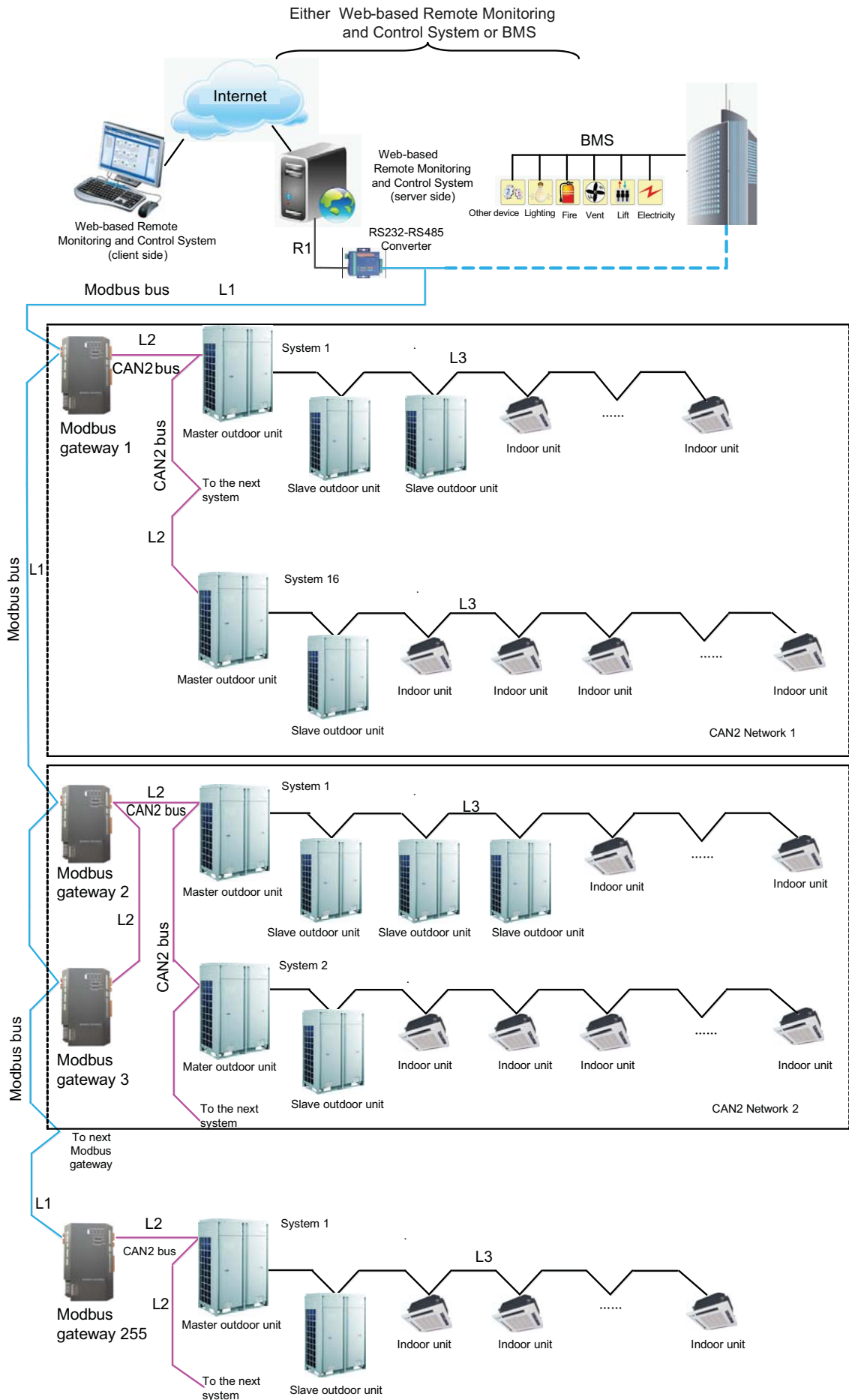
4.1 Web-based Remote Monitoring and Control System

The Modbus gateway is applicable to be used to integrate the air conditioning system, including VRF5 DC inverter system, and AlpicAir water-source heat pump system, with the web-based remote monitoring and control system which then will take the long-distance monitoring or energy management to the air conditioning system via the Modbus gateway. web-based remote monitoring and control system is connected with the Modbus gateway through the computer's serial port. Each serial port can support up to 255 Modbus gateways. When the number of the gateway exceeds 255, another serial port is required.

4.2 BMS

This gateway compatible with the Modbus standard protocol can be taken as the BMS interface to integrate the air conditioning system, including VRF5 DC inverter system and AlpicAir water-source heat pump system, into the BMS (Building Management System) which will take the monitoring and control to the air conditioning system. One Modbus bus can supports up to 255 Modbus gateways.

4.3 Topological Diagram



Modbus bus: L1 represents the Modbus bus which can support up to 255 Modbus gateways.

CAN2 bus: L2 represents the CAN2 bus which is the link to the Modbus gateway and the master outdoor unit.

CAN2 network: in one CAN2 network, a maximum of 16 air conditioning systems and 255 indoor units are allowed. If exceeded, the CAN2 network should be divided into two.

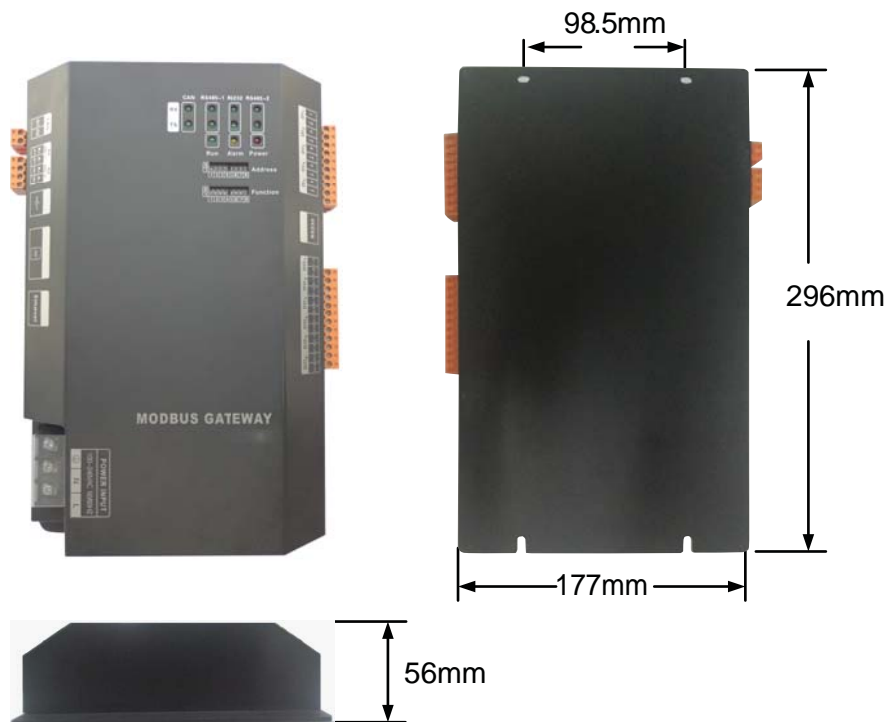
Air conditioning system: one air conditioning system consists of at most four outdoor units (among them one is the master unit) as well as the matched indoor units.

Allowable number accessible to the gateway: one Modbus gateway can support at most 16 air conditioning system(each system includes at most 4 outdoor unit) and the total maximum allowable indoor units is 128. If exceeded, another Modbus gateway will be required as shown in CAN2 Network 2.

5 Installation

5.1 Product Dimensions and Dimensions of the Electric Cabinet

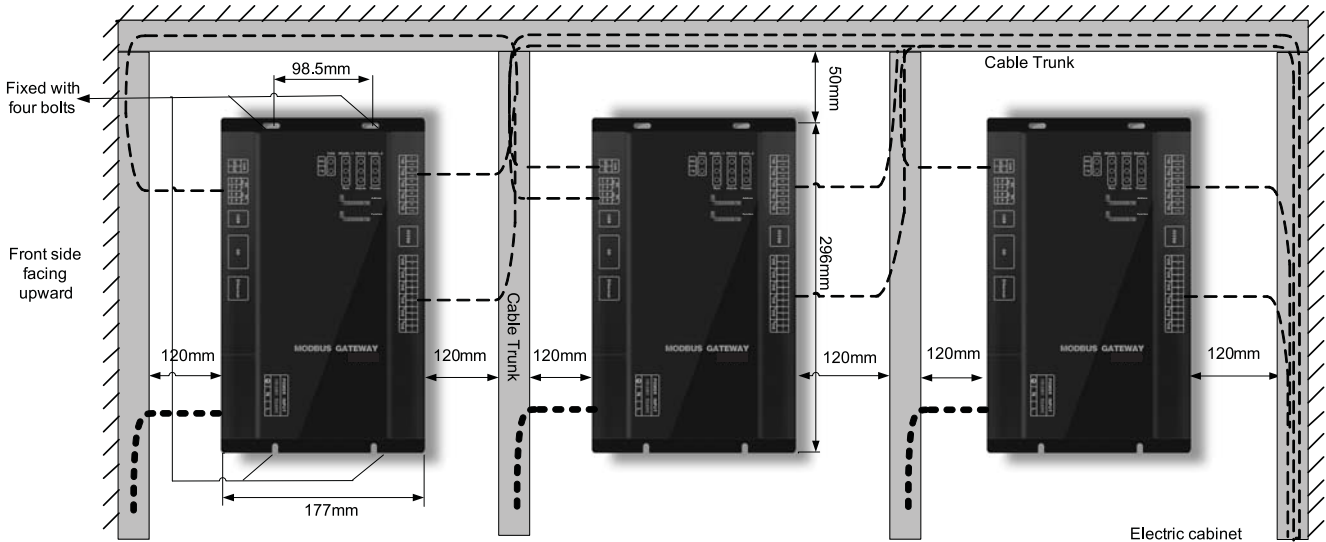
5.1.1 Product Dimensions



L×W×H: 296×177×56 mm

5.1.2 Dimensions of the Electric Cabinet

The Modbus gateway should be located inside the electric cabinet, hung up with the front side facing upwards and fixed with four bolts. See the following figure for the required clearance (only for reference).



⚠ WARNING

Power lines and communication lines of the Modbus gateway should be routed separately; otherwise the Modbus gateway would fail to work.

As shown in the figure above, the slim lines represent the communication lines and the bold lines represent the power lines. However, they both are only for reference.

5.2 Communication

The Modbus gateway works to get through the communication

- (1) between the Modbus gateway and the Web-based Remote Monitoring and Control System/BMS.
- (2) between the Modbus gateway and the air conditioning system.

5.2.1 Communication Lines

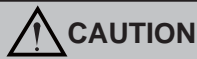
(1) Communication lines between the Modbus gateway and the Web-based Remote Monitoring and Control System/BMS

Type	Size	Applicable Standard	Remarks
Category five twisted pairs	24AWG (2×0.6mm)	TIA/EIA-568-A	An optoelectrical repeater is required when the communication distance is more than 800m.

(2) Communication lines between the Modbus gateway and the air conditioning system

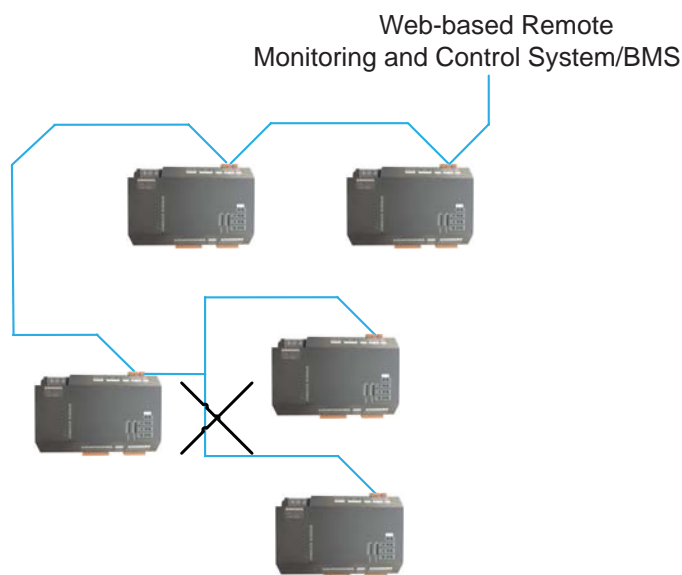
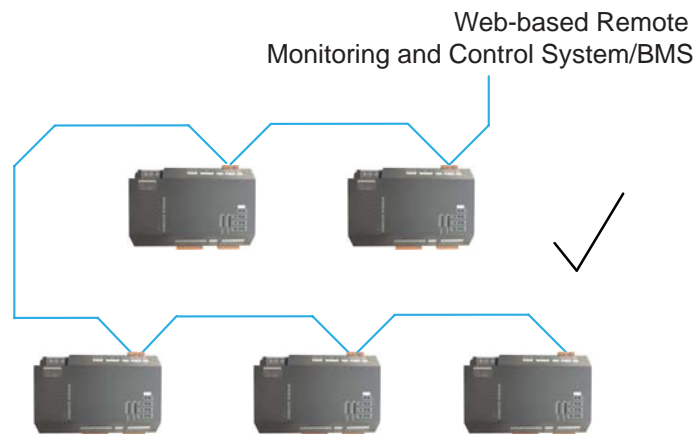
Type	Length(m)	Wire Gauge (mm ²)	Applicable Standard	Remarks
Light PVC-sheathed copper twisted pairs (RVV)	L ≤ 500	≥ 2×0.75	GB/T 5023.5-2008	The allowable maximum length is 500m.

5.2.2 Connection of Communication Lines

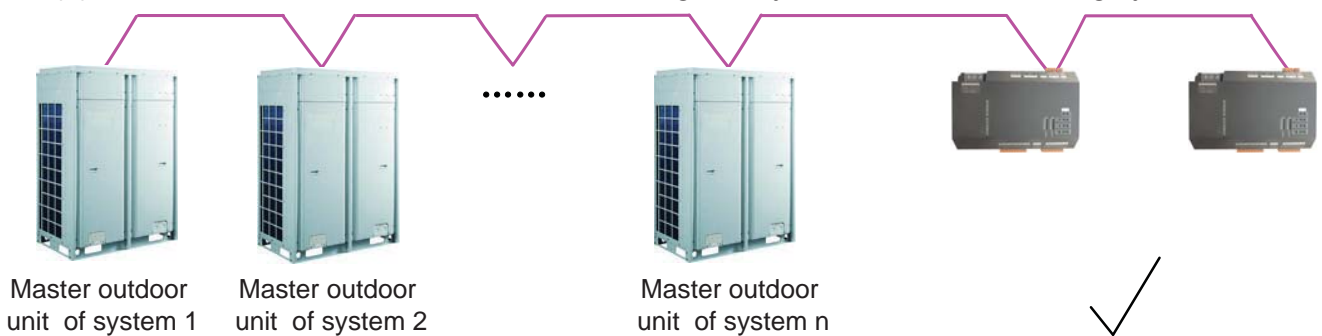


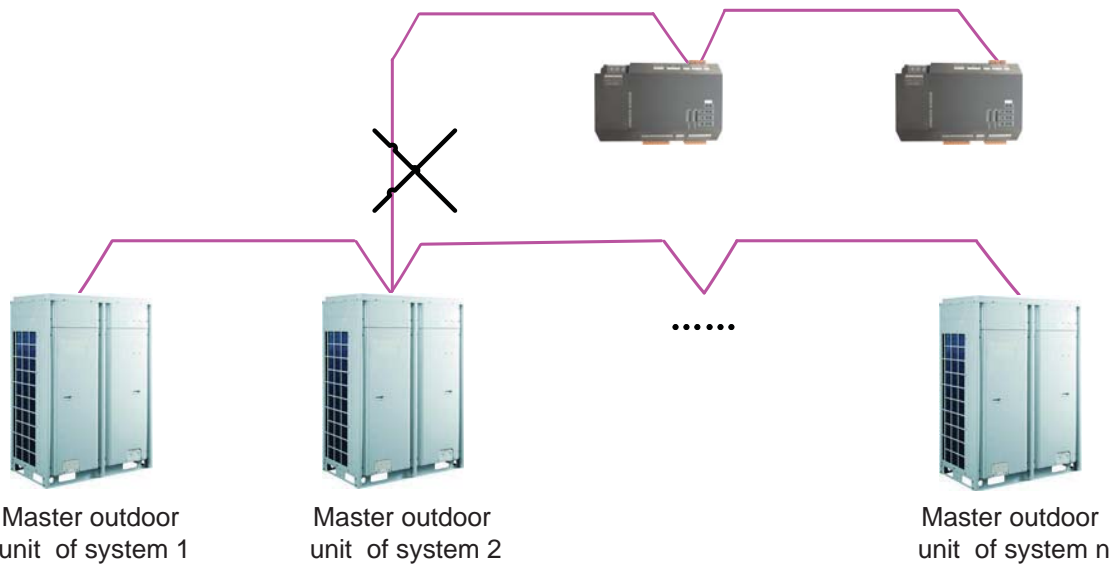
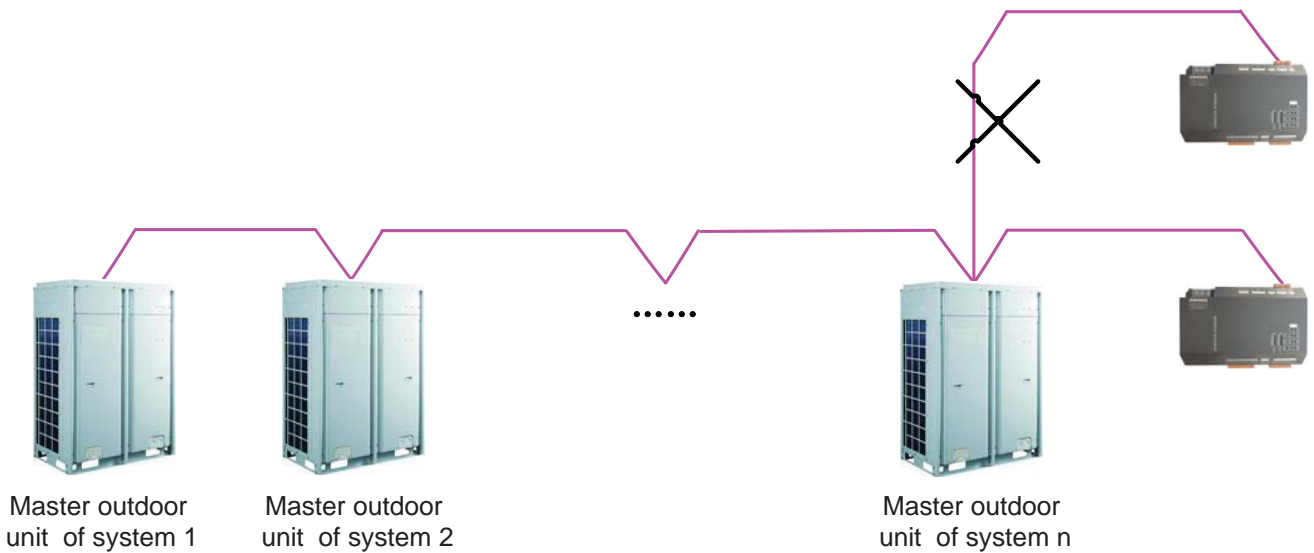
Only serial connection is allowed for all communication lines of the Modbus gateway. The star connection is prohibited

(1) Communication lines between the Modbus gateway and the Web-based remote monitoring and control system/BMS



(2) Communication lines between the Modbus gateway and the air conditioning system.





“n” (n≤16) represents the quantity of the air conditioning systems.

5.2.3 Connection Steps

(1) Connection between the Modbus gateway and the web-based remote monitoring and control system/BMS

Step 1: confirm the first Modbus gateway (Modbus gateway 1) to be connected to the web-based remote monitoring and control system/BMS, and then connect RS485-1 interface R+ and R- of this Modbus gateway to the optoelectric converter interface R+ and R- or BMS through communication lines. (see ①) .

Step 2: connect RS485-1 interface R+ and R- of Modbus gateway 1 to the second Modbus gateway (Modbus gateway 2) RS485-1 interface R+ and R- through communication lines. (see ②).

Step 3: follow the same way as in Step 2 to connect other Modbus gateways in series. (see ③)

(2) Connection between the Modbus gateway and the air conditioning system.

Step1: conform the master units to be connected to each Modbus gateway. Serial connection should be applied as described in Section 5.2.2.(2) Communication lines between the Modbus gateway and the air conditioning system. (see ④) .

Step 2: connect the Modbus gateway's CAN interface G1 and G2 to the interface G1 and G2 at the terminal board of the corresponding master unit. (see ⑤) .

Step 3: when two Modbus gateways (gateway 2 and gateway 3) are required for one CAN2 network, connect one gateway's (gateway 2) CAN interface G1 and G2 to the interface G1 and G2 at the terminal board of the master unit, and then connect the other gateway's (gateway 3) interface G1 and G2 to the interface G1 and G2 of the former gateway (gateway 2). (see ⑥ and ⑦) .

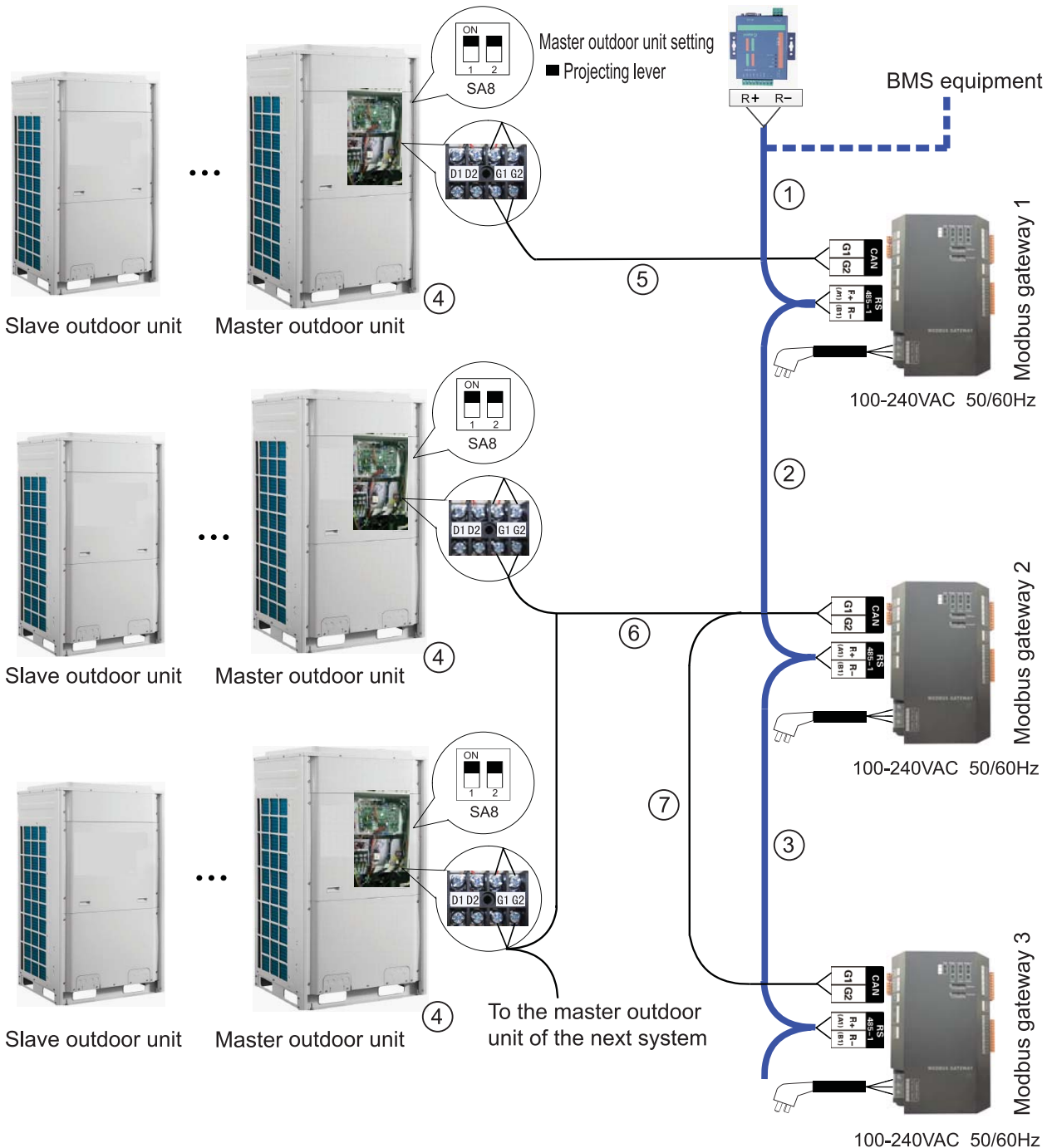
See Section 4.3 for the definition of the CAN2 network .

(3) DIP Switch Setting of the Modbus Gateway

Step 1: see Section 3.3.2 for the address setting of the Modbus gateway.

Step 2: see Section 3.3.3-3.3.4 for the matched resistance setting of the Modbus gateway.

Step 3: see Section 3.3.5 for the first indoor number setting of the Modbus gateway.



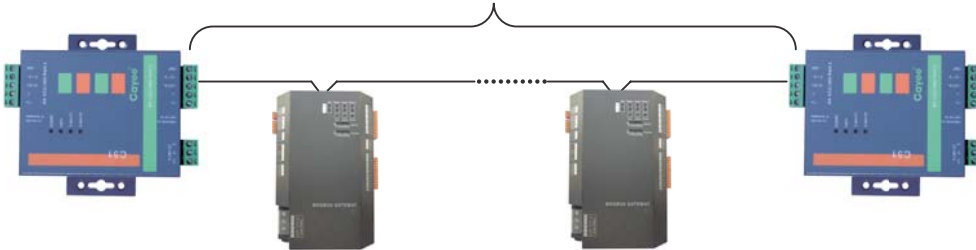
Notes:

1). When more than 30 Modbus gateways are used or the communication distance is more than 800, an optoelectric repeater is required and its interface R+ and R- should be connected to the RS485-1 interface R+ and R- of the Modbus gateway.

30 Modbus gateways at most is allowed between two repeaters.



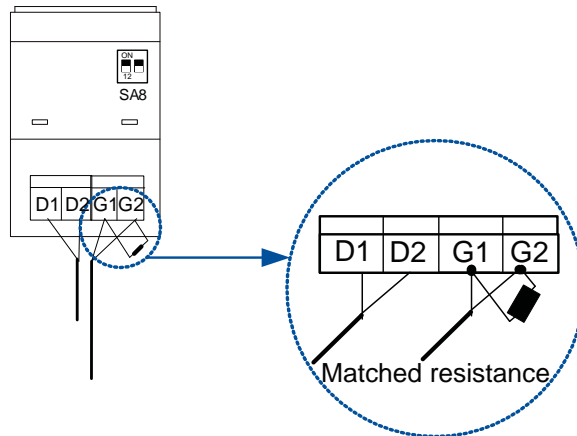
The total communication distance of at most 800m is allowed between two repeaters.



2). In the similar way as described in Section 3.3.3, the master outdoor unit located at either end of the CAN2 bus should be coupled with a matched resistance. The example listed below shows how to set the matched resistance for the VRF5 DC inverter system.

See Section 4.3 for the definition of the CAN2 bus.

Master Outdoor Unit



Appendix A: Address Codes of the DIP Switch

Address Codes 0-31								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	/
1	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	2
1	1	0	0	0	0	0	0	3
0	0	1	0	0	0	0	0	4
1	0	1	0	0	0	0	0	5
0	1	1	0	0	0	0	0	6
1	1	1	0	0	0	0	0	7
0	0	0	1	0	0	0	0	8
1	0	0	1	0	0	0	0	9
0	1	0	1	0	0	0	0	10
1	1	0	1	0	0	0	0	11
0	0	1	1	0	0	0	0	12
1	0	1	1	0	0	0	0	13
0	1	1	1	0	0	0	0	14
1	1	1	1	0	0	0	0	15
0	0	0	0	1	0	0	0	16
1	0	0	0	1	0	0	0	17
0	1	0	0	1	0	0	0	18
1	1	0	0	1	0	0	0	19
0	0	1	0	1	0	0	0	20
1	0	1	0	1	0	0	0	21
0	1	1	0	1	0	0	0	22
1	1	1	0	1	0	0	0	23
0	0	0	1	1	0	0	0	24
1	0	0	1	1	0	0	0	25
0	1	0	1	1	0	0	0	26
1	1	0	1	1	0	0	0	27
0	0	1	1	1	0	0	0	28
1	0	1	1	1	0	0	0	29
0	1	1	1	1	0	0	0	30
1	1	1	1	1	0	0	0	31

Address Codes 32-63								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	1	0	0	32
1	0	0	0	0	1	0	0	33
0	1	0	0	0	1	0	0	34
1	1	0	0	0	1	0	0	35
0	0	1	0	0	1	0	0	36
1	0	1	0	0	1	0	0	37
0	1	1	0	0	1	0	0	38
1	1	1	0	0	1	0	0	39
0	0	0	1	0	1	0	0	40
1	0	0	1	0	1	0	0	41
0	1	0	1	0	1	0	0	42
1	1	0	1	0	1	0	0	43
0	0	1	1	0	1	0	0	44
1	0	1	1	0	1	0	0	45
0	1	1	1	0	1	0	0	46
1	1	1	1	0	1	0	0	47
0	0	0	0	1	1	0	0	48
1	0	0	0	1	1	0	0	49
0	1	0	0	1	1	0	0	50
1	1	0	0	1	1	0	0	51
0	0	1	0	1	1	0	0	52
1	0	1	0	1	1	0	0	53
0	1	1	0	1	1	0	0	54
1	1	1	0	1	1	0	0	55
0	0	0	1	1	1	0	0	56
1	0	0	1	1	1	0	0	57
0	1	0	1	1	1	0	0	58
1	1	0	1	1	1	0	0	59
0	0	1	1	1	1	0	0	60
1	0	1	1	1	1	0	0	61
0	1	1	1	1	1	0	0	62
1	1	1	1	1	1	0	0	63

Address Codes 64-95								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	1	0	64
1	0	0	0	0	0	1	0	65
0	1	0	0	0	0	1	0	66
1	1	0	0	0	0	1	0	67
0	0	1	0	0	0	1	0	68
1	0	1	0	0	0	1	0	69
0	1	1	0	0	0	1	0	70
1	1	1	0	0	0	1	0	71
0	0	0	1	0	0	1	0	72
1	0	0	1	0	0	1	0	73
0	1	0	1	0	0	1	0	74
1	1	0	1	0	0	1	0	75
0	0	1	1	0	0	1	0	76
1	0	1	1	0	0	1	0	77
0	1	1	1	0	0	1	0	78
1	1	1	1	0	0	1	0	79
0	0	0	0	1	0	1	0	80
1	0	0	0	1	0	1	0	81
0	1	0	0	1	0	1	0	82
1	1	0	0	1	0	1	0	83
0	0	1	0	1	0	1	0	84
1	0	1	0	1	0	1	0	85
0	1	1	0	1	0	1	0	86
1	1	1	0	1	0	1	0	87
0	0	0	1	1	0	1	0	88
1	0	0	1	1	0	1	0	89
0	1	0	1	1	0	1	0	90
1	1	0	1	1	0	1	0	91
0	0	1	1	1	0	1	0	92
1	0	1	1	1	0	1	0	93
0	1	1	1	1	0	1	0	94
1	1	1	1	1	0	1	0	95

Address Codes 96-127								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	1	1	0	96
1	0	0	0	0	1	1	0	97
0	1	0	0	0	1	1	0	98
1	1	0	0	0	1	1	0	99
0	0	1	0	0	1	1	0	100
1	0	1	0	0	1	1	0	101
0	1	1	0	0	1	1	0	102
1	1	1	0	0	1	1	0	103
0	0	0	1	0	1	1	0	104
1	0	0	1	0	1	1	0	105
0	1	0	1	0	1	1	0	106
1	1	0	1	0	1	1	0	107
0	0	1	1	0	1	1	0	108
1	0	1	1	0	1	1	0	109
0	1	1	1	0	1	1	0	110
1	1	1	1	0	1	1	0	111
0	0	0	0	1	1	1	0	112
1	0	0	0	1	1	1	0	113
0	1	0	0	1	1	1	0	114
1	1	0	0	1	1	1	0	115
0	0	1	0	1	1	1	0	116
1	0	1	0	1	1	1	0	117
0	1	1	0	1	1	1	0	118
1	1	1	0	1	1	1	0	119
0	0	0	1	1	1	1	0	120
1	0	0	1	1	1	1	0	121
0	1	0	1	1	1	1	0	122
1	1	0	1	1	1	1	0	123
0	0	1	1	1	1	1	0	124
1	0	1	1	1	1	1	0	125
0	1	1	1	1	1	1	0	126
1	1	1	1	1	1	1	0	127

Address Codes 128-159								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	1	128
1	0	0	0	0	0	0	1	129
0	1	0	0	0	0	0	1	130
1	1	0	0	0	0	0	1	131
0	0	1	0	0	0	0	1	132
1	0	1	0	0	0	0	1	133
0	1	1	0	0	0	0	1	134
1	1	1	0	0	0	0	1	135
0	0	0	1	0	0	0	1	136
1	0	0	1	0	0	0	1	137
0	1	0	1	0	0	0	1	138
1	1	0	1	0	0	0	1	139
0	0	1	1	0	0	0	1	140
1	0	1	1	0	0	0	1	141
0	1	1	1	0	0	0	1	142
1	1	1	1	0	0	0	1	143
0	0	0	0	1	0	0	1	144
1	0	0	0	1	0	0	1	145
0	1	0	0	1	0	0	1	146
1	1	0	0	1	0	0	1	147
0	0	1	0	1	0	0	1	148
1	0	1	0	1	0	0	1	149
0	1	1	0	1	0	0	1	150
1	1	1	0	1	0	0	1	151
0	0	0	1	1	0	0	1	152
1	0	0	1	1	0	0	1	153
0	1	0	1	1	0	0	1	154
1	1	0	1	1	0	0	1	155
0	0	1	1	1	0	0	1	156
1	0	1	1	1	0	0	1	157
0	1	1	1	1	0	0	1	158
1	1	1	1	1	0	0	1	159

Address Codes 160-191								
Address DIP								Add
1	2	3	4	5	6	7	8	
0	0	0	0	0	1	0	1	160
1	0	0	0	0	1	0	1	161
0	1	0	0	0	1	0	1	162
1	1	0	0	0	1	0	1	163
0	0	1	0	0	1	0	1	164
1	0	1	0	0	1	0	1	165
0	1	1	0	0	1	0	1	166
1	1	1	0	0	1	0	1	167
0	0	0	1	0	1	0	1	168
1	0	0	1	0	1	0	1	169
0	1	0	1	0	1	0	1	170
1	1	0	1	0	1	0	1	171
0	0	1	1	0	1	0	1	172
1	0	1	1	0	1	0	1	173
0	1	1	1	0	1	0	1	174
1	1	1	1	0	1	0	1	175
0	0	0	0	1	1	0	1	176
1	0	0	0	1	1	0	1	177
0	1	0	0	1	1	0	1	178
1	1	0	0	1	1	0	1	179
0	0	1	0	1	1	0	1	180
1	0	1	0	1	1	0	1	181
0	1	1	0	1	1	0	1	182
1	1	1	0	1	1	0	1	183
0	0	0	1	1	1	0	1	184
1	0	0	1	1	1	0	1	185
0	1	0	1	1	1	0	1	186
1	1	0	1	1	1	0	1	187
0	0	1	1	1	1	0	1	188
1	0	1	1	1	1	0	1	189
0	1	1	1	1	1	0	1	190
1	1	1	1	1	1	0	1	191

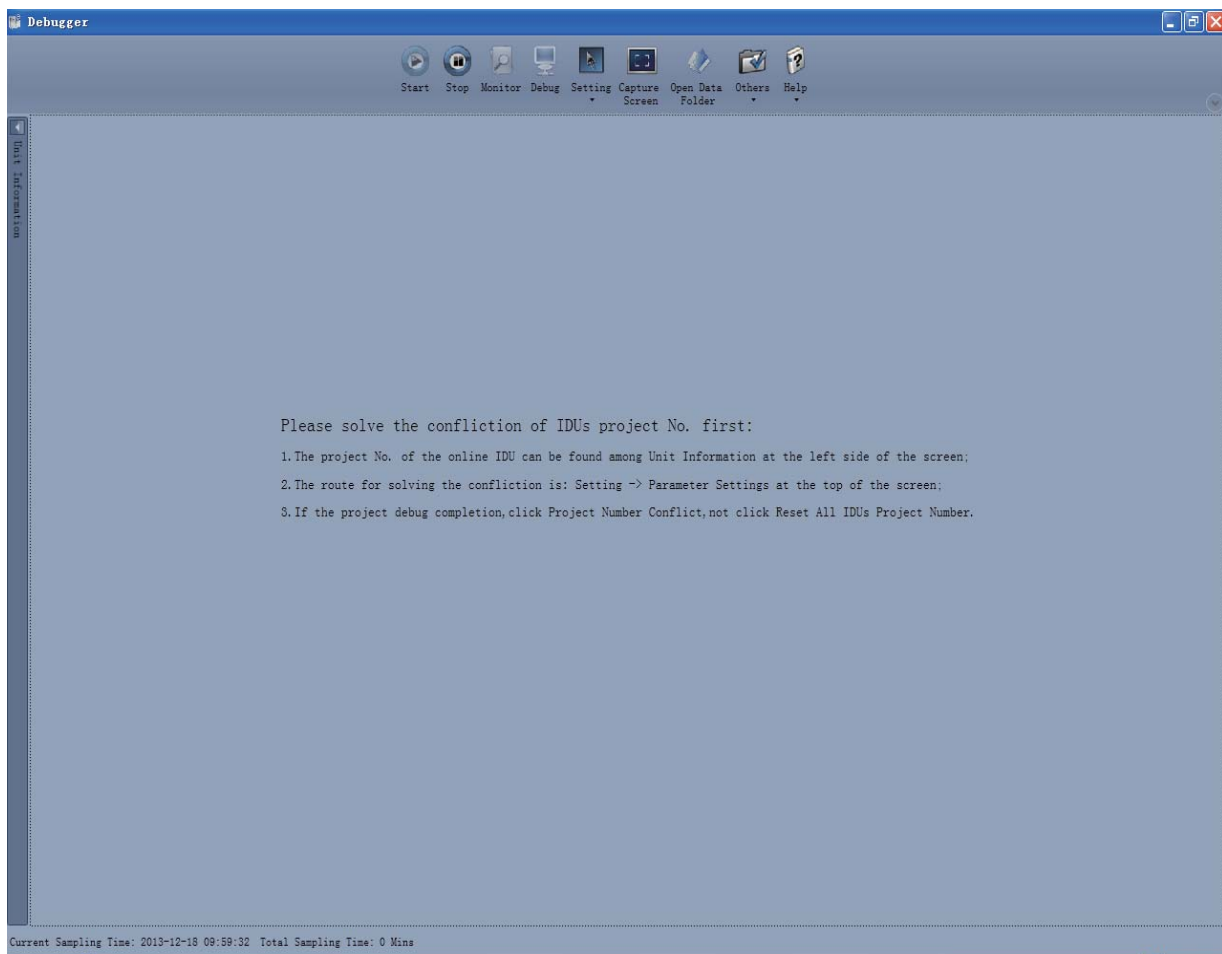
Address Codes 192-223									Address Codes 224-255								
Address DIP								Add	Address DIP								Add
1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	
0	0	0	0	0	0	1	1	192	0	0	0	0	0	1	1	1	224
1	0	0	0	0	0	1	1	193	1	0	0	0	0	1	1	1	225
0	1	0	0	0	0	1	1	194	0	1	0	0	0	1	1	1	226
1	1	0	0	0	0	1	1	195	1	1	0	0	0	1	1	1	227
0	0	1	0	0	0	1	1	196	0	0	1	0	0	1	1	1	228
1	0	1	0	0	0	1	1	197	1	0	1	0	0	1	1	1	229
0	1	1	0	0	0	1	1	198	0	1	1	0	0	1	1	1	230
1	1	1	0	0	0	1	1	199	1	1	1	0	0	1	1	1	231
0	0	0	1	0	0	1	1	200	0	0	0	1	0	1	1	1	232
1	0	0	1	0	0	1	1	201	1	0	0	1	0	1	1	1	233
0	1	0	1	0	0	1	1	202	0	1	0	1	0	1	1	1	234
1	1	0	1	0	0	1	1	203	1	1	0	1	0	1	1	1	235
0	0	1	1	0	0	1	1	204	0	0	1	1	0	1	1	1	236
1	0	1	1	0	0	1	1	205	1	0	1	1	0	1	1	1	237
0	1	1	1	0	0	1	1	206	0	1	1	1	0	1	1	1	238
1	1	1	1	0	0	1	1	207	1	1	1	1	0	1	1	1	239
0	0	0	0	1	0	1	1	208	0	0	0	0	1	1	1	1	240
1	0	0	0	1	0	1	1	209	1	0	0	0	1	1	1	1	241
0	1	0	0	1	0	1	1	210	0	1	0	0	1	1	1	1	242
1	1	0	0	1	0	1	1	211	1	1	0	0	1	1	1	1	243
0	0	1	0	1	0	1	1	212	0	0	1	0	1	1	1	1	244
1	0	1	0	1	0	1	1	213	1	0	1	0	1	1	1	1	245
0	1	1	0	1	0	1	1	214	0	1	1	0	1	1	1	1	246
1	1	1	0	1	0	1	1	215	1	1	1	0	1	1	1	1	247
0	0	0	1	1	0	1	1	216	0	0	0	1	1	1	1	1	248
1	0	0	1	1	0	1	1	217	1	0	0	1	1	1	1	1	249
0	1	0	1	1	0	1	1	218	0	1	0	1	1	1	1	1	250
1	1	0	1	1	0	1	1	219	1	1	0	1	1	1	1	1	251
0	0	1	1	1	0	1	1	220	0	0	1	1	1	1	1	1	252
1	0	1	1	1	0	1	1	221	1	0	1	1	1	1	1	1	253
0	1	1	1	1	0	1	1	222	0	1	1	1	1	1	1	1	254
1	1	1	1	1	0	1	1	223	1	1	1	1	1	1	1	1	255

Appendix B: Special description of C5 error in central control for multiple cooling systems

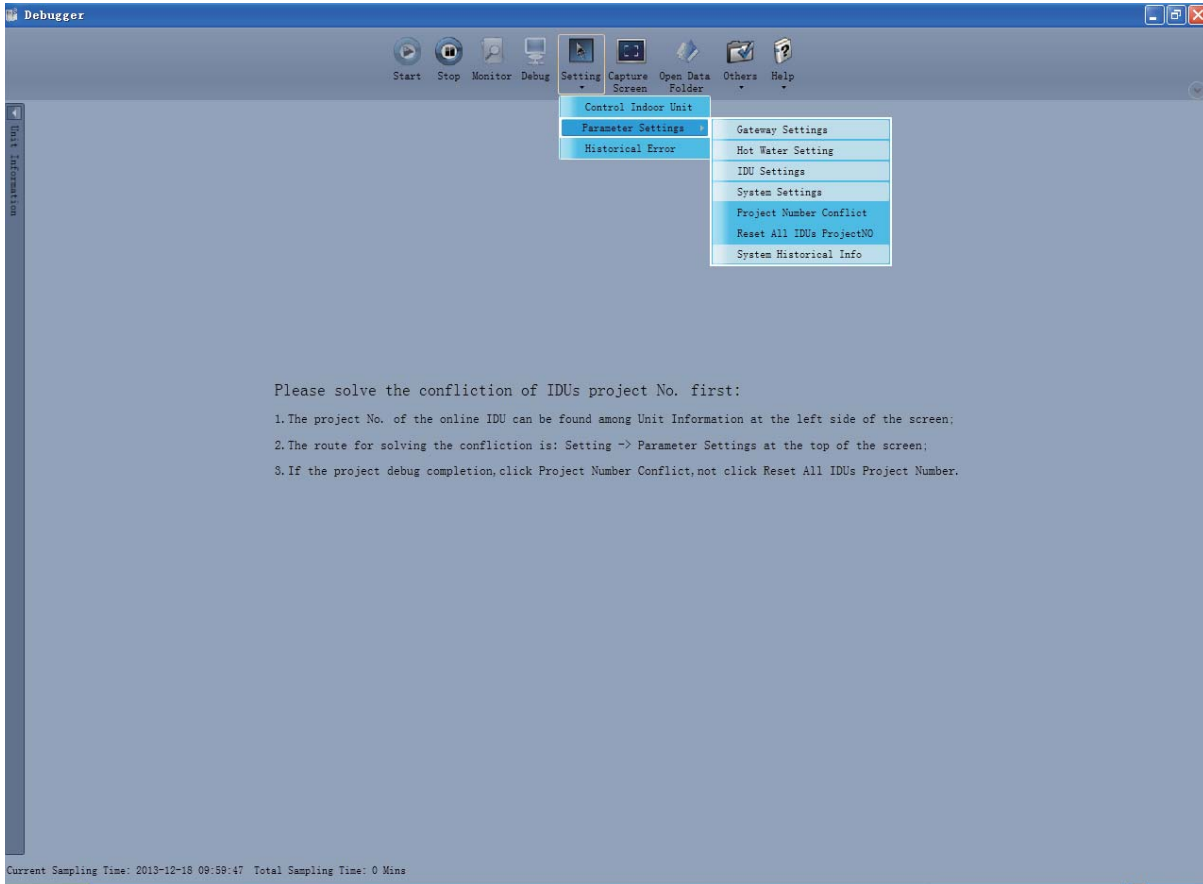
When multiple cooling systems are in central control, the project no. conflict error C5 may occur among different cooling systems. In such case, reset the project no. of each system and then follow the methods described below:

(1) Project no. conflict

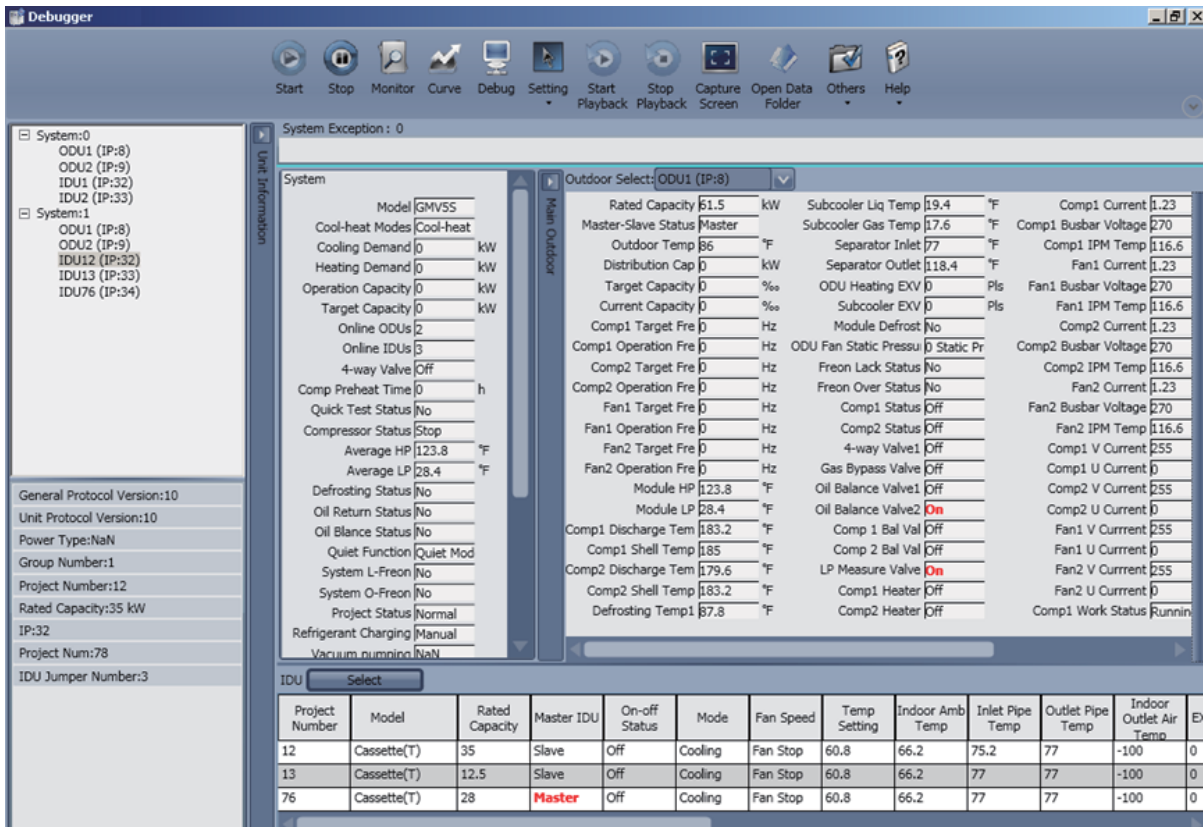
When there is central control among different cooling systems, if the project numbers of any two or more indoor units are the same, indoor units will have project no. conflict error and can't transfer in modes or operate functionally. The entire unit can't be started up until error is eliminated. The Debugger software displays as below:



- (2) Handling method of project no. conflict
 1) Set manually on the Debugger software:



After setting is finished, if the conflict of project number is eliminated, system will start normal operation. Display is as show below:



2) Set manually on the wired controller or remote controller:

If project numbers of indoor units are in conflict, you can change the settings through a wired controller or remote controller to solve the conflict. Please refer to the instruction manual of wired controllers or remote controllers for the operation details. This method is not available when the IDU is under project debugging status.

3) Auto deviation setting of project no. in ODU's main board:

Auto deviation of IDU project numbers can be realized through the main board of outdoor unit. Following is the operation method:

- ① . After the entire unit finishes debugging, press button SW3 on the master unit, then system will be in the standby status for function selection, as shown below:

LED1		LED2		LED3	
Function No.	Display way	Current progress	Display way	Current status	Display way
A7	blink	00	blink	00	blink
A6	blink	00	blink	00	blink
A2	blink	00	blink	00	blink
A8	blink	00	blink	00	blink
n0	blink	01	blink	00	blink
n1	blink	00	blink	00	blink
n2	blink	00	blink	00	blink
n3	blink	00	blink	00	blink
n4	blink	00	blink	00	blink
n5	blink	00	blink	00	blink

- ② . Then press the down button SW2 (▼) on the master unit and choose “n5”. Short press the confirm button SW7 to enter the function setting. Display is as below:

LED1		LED2		LED3	
Function No.	Display way	Current progress	Display way	Current status	Display way
n5	Lit up	00	Blink	OC	Blink

- ③ . When the setting of project number deviation is in standby status, short press button SW7 to confirm the setting. Display is as below:

LED1		LED2		LED3	
Function No.	Display way	Current progress/mode	Display way	Current status	Display way
n5	Lit up	00	Lit up	OC	Lit up

Later then, all project numbers of indoor units will be automatically deviated. After about 1min, system will function as normal.

(Auto deviation will only be effective when operating on the master unit whose central control address is “00000”).

Remark: This handling method may change the project numbers of other normal units and it is suitable for the first time installation and debugging.

Appendix C: Debugging of our CAC Remote Monitoring System (Modbus connection)

After the communication system is properly installed and connected, please follow the steps below to debug the communication system.

C-1 Debug the cooling system

Before debugging the remote monitoring system, make sure the relevant settings of the air conditioning system have been finished. These settings are:

Step 1: The setting of master unit in a single system and the central control address setting in multiple systems

- (1) Make sure the master unit code of each cooling system is correctly set (please refer to unit's service manual for the operation details).
- (2) If multiple cooling systems are connected, make sure the central control address code of each cooling system is correctly set (please refer to unit's service manual for the operation details).

Step 2: Deviation setting of IDU project numbers

For the first time installation and debugging, after system is connected, if there is C5 error of project conflict, please follow the steps below to deviate the project numbers.

- (1) Short press function button SW3 on the master unit whose central control address is 0. Then system will be in the standby status for function selection and master unit will display as below. Default display is "A7". Display of the master unit is:

LED1		LED2		LED3	
Function No.	Display way	Current progress	Display way	Current status	Display way
A7	blink	00	blink	00	blink

- (2) Then press the down button SW2 (▼) and choose the function no. n5 (deviation setting of IDU project number). Short press confirm button SW7 to enter the function setting. Display is as below:

LED1		LED2		LED3	
Function No.	Display way	Current progress	Display way	Current status	Display way
n5	lit up	00	blink	00	blink

- (3) When unit is in standby status of function confirmation, short press button SW7 to enter the deviation status of project numbers. Display is as below:

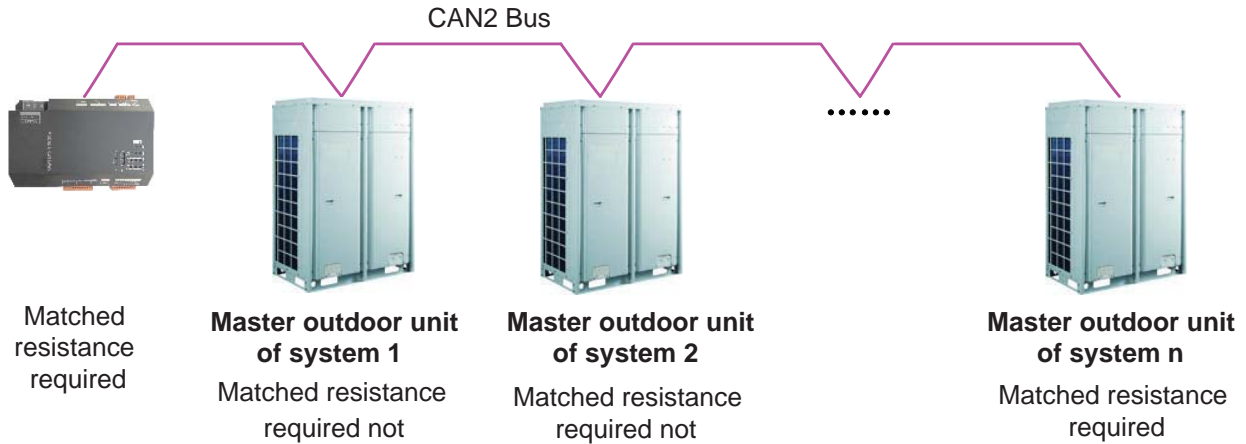
LED1		LED2		LED3	
Function No.	Display way	Current progress	Display way	Current status	Display way
n5	lit up	00	lit up	00	lit up

At that time, all project numbers of indoor units will be automatically deviated. After about 1min, system will function as normal. (Auto deviation will only be effective when operating on the master unit whose central control address is 0.)

Remark: When there are many conflicts of IDU project number, auto deviation is recommended for it is faster and easier. But this handling method may change the project numbers of other normal units and it is suitable for the first time installation and debugging.

C-2 Communication debugging of Modbus gateway and air conditioning units

Step 1: CAN2 matched resistance setting

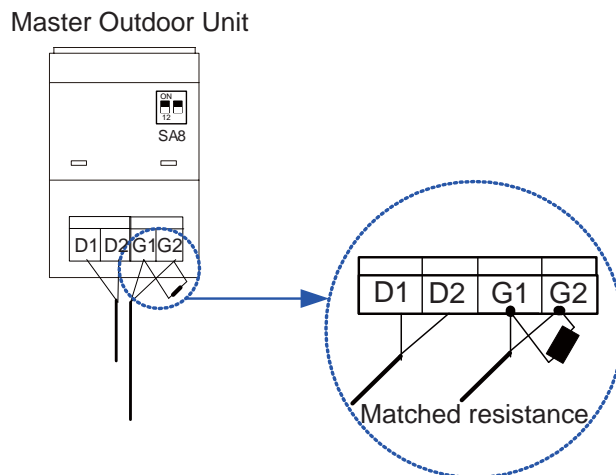


“n” (n≤16) represents the quantity of the air conditioning systems.

As shown here, the master outdoor unit at the front end and back end of the CAN2 bus and the Modbus gateway need to be set with matched resistance.

Please refer to section “3.3.3 Function DIP Switch-CAN2 Bus Matched Resistance Setting” in the instruction manual to see how to add matched resistance to the Modbus gateway.

The way to add matched resistance to system’s master outdoor units:



Step 2: Disconnect and then connect power for the air conditioning equipment and Modbus gateway.

Step 3: Check the status of communication indicators

Check the CAN_RX indicator of Modbus gateway. If it blinks, then communication is ok. Otherwise, please check the master unit whose central control address is 0 and see if its LED G_TX is blinking or lit up. If the light is not lit up, please check the connection of communication cords and the setting of DIP switch.

C-3 Setting of Modbus gateway’s DIP switch

Step 1: Set equipment address

Please refer to section “3.3.2 Address DIP Switch” in the instruction manual to set the address of Modbus gateway. Make sure the address codes of gateways on the same Modbus are all different. The setting range is 1~255.

Step 2: Set the first indoor project number of gateway

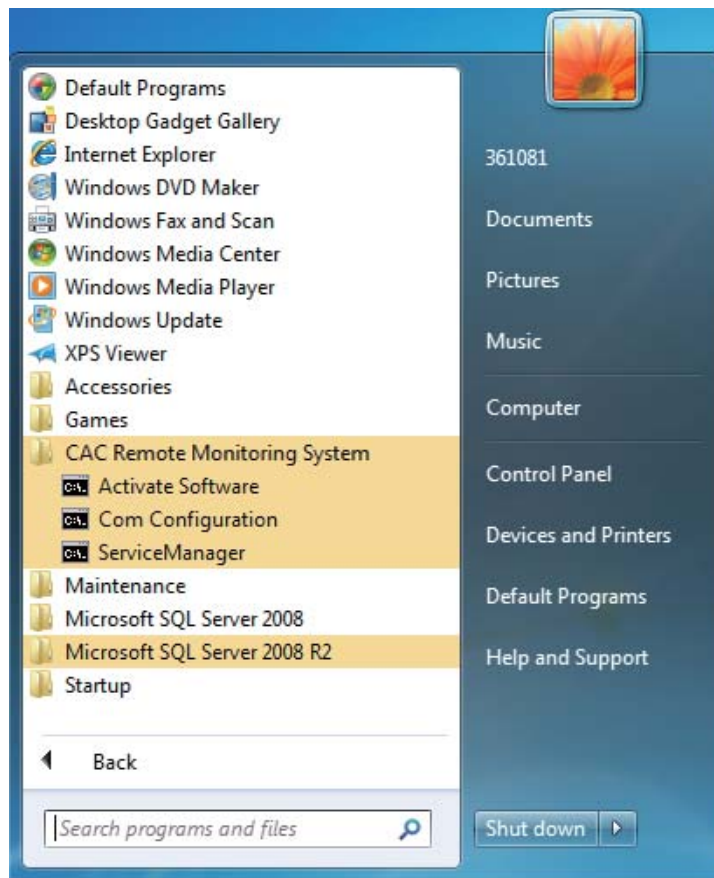
According to the range of IDU project number related to gateway, set the project number of indoor unit that's at the beginning of gateway to be 1 or 129. Please refer to section 3.3.5 in the instruction manual for the operation method.

C-4 Communicaiton debugging of Modbus gateway and remote monitoring system

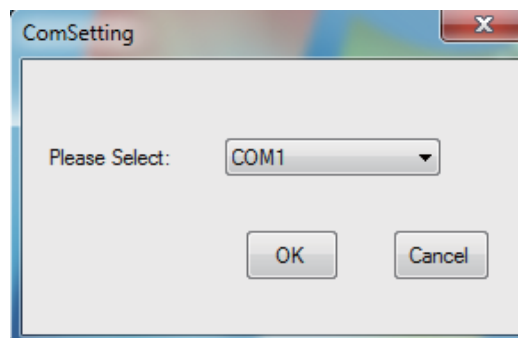
After the software of remote monitoring system is successfully installed, please follow the steps below.

Step 1: Configuraiton for Modbus communication ports

Start——CAC Remote Monitoring System——Com Configuration



Please select the proper port in the pop-up window and click OK.



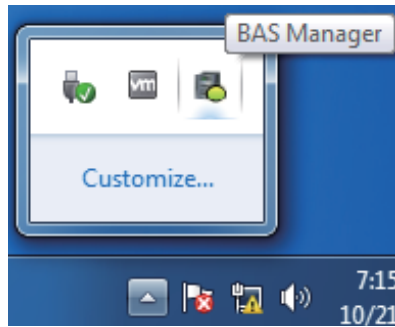
Another window will then pop up to indicate restart-up. Click OK.

Step 2: Energize “BAS Manager” service

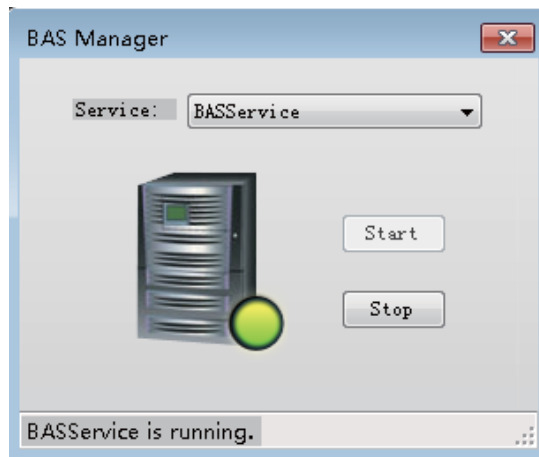
Two ways to start up BAS Manager.

- (1) a. Right click the BAS Manager icon that is at the bottom right corner of computer's desktop.

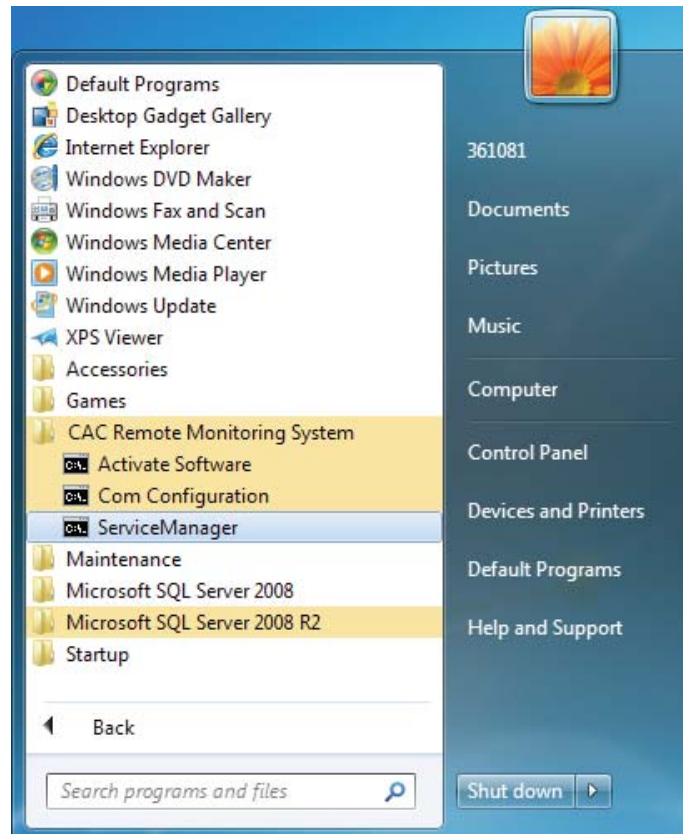
Select “open”.



b. In the pop-up window of BAS Manager, click “Start”. Then service will be energized.



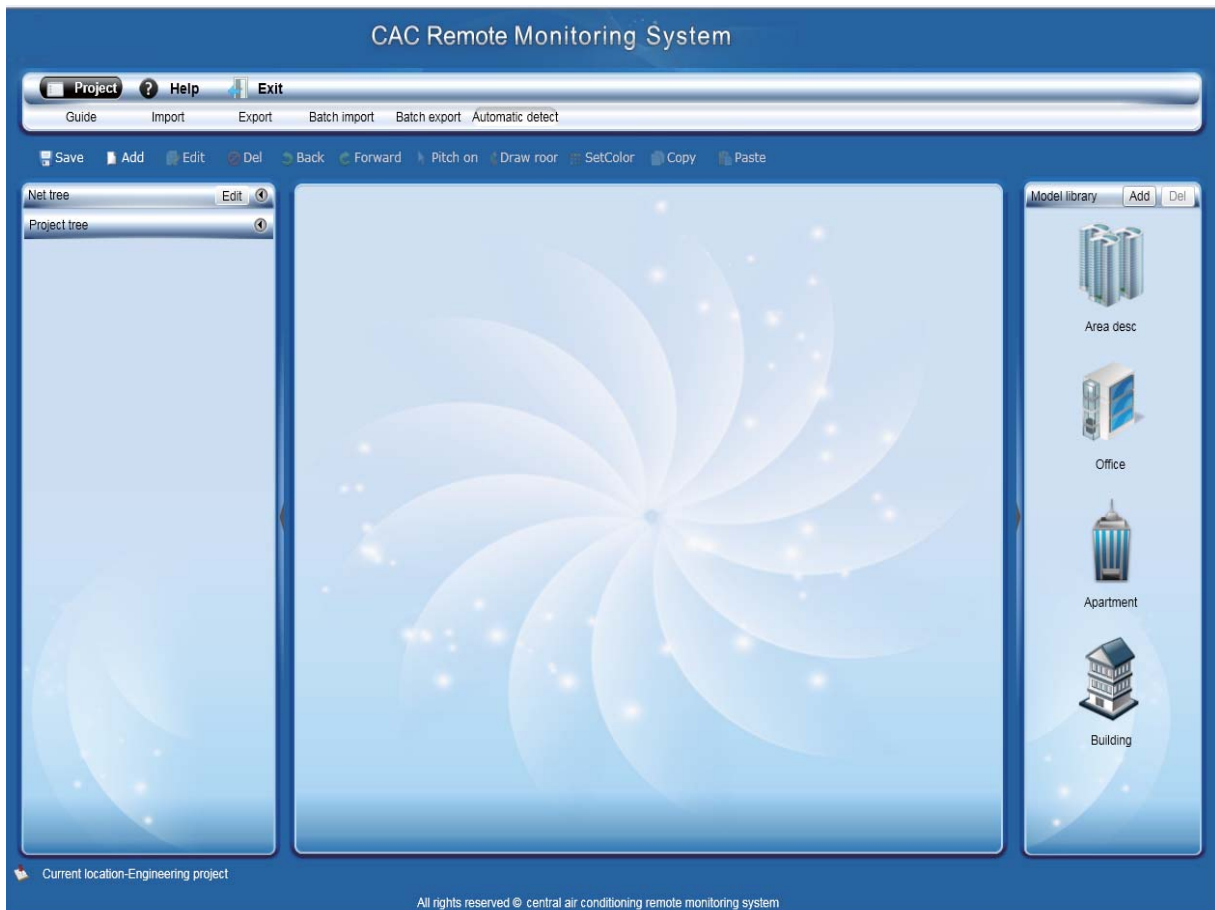
(2) Click in the following sequence: “Start—>All Programs—> CAC Remote Monitoring System—>BAS Manager”. Then in the pop-up window of BAS Manager, click “Start”. Then service will be energized.

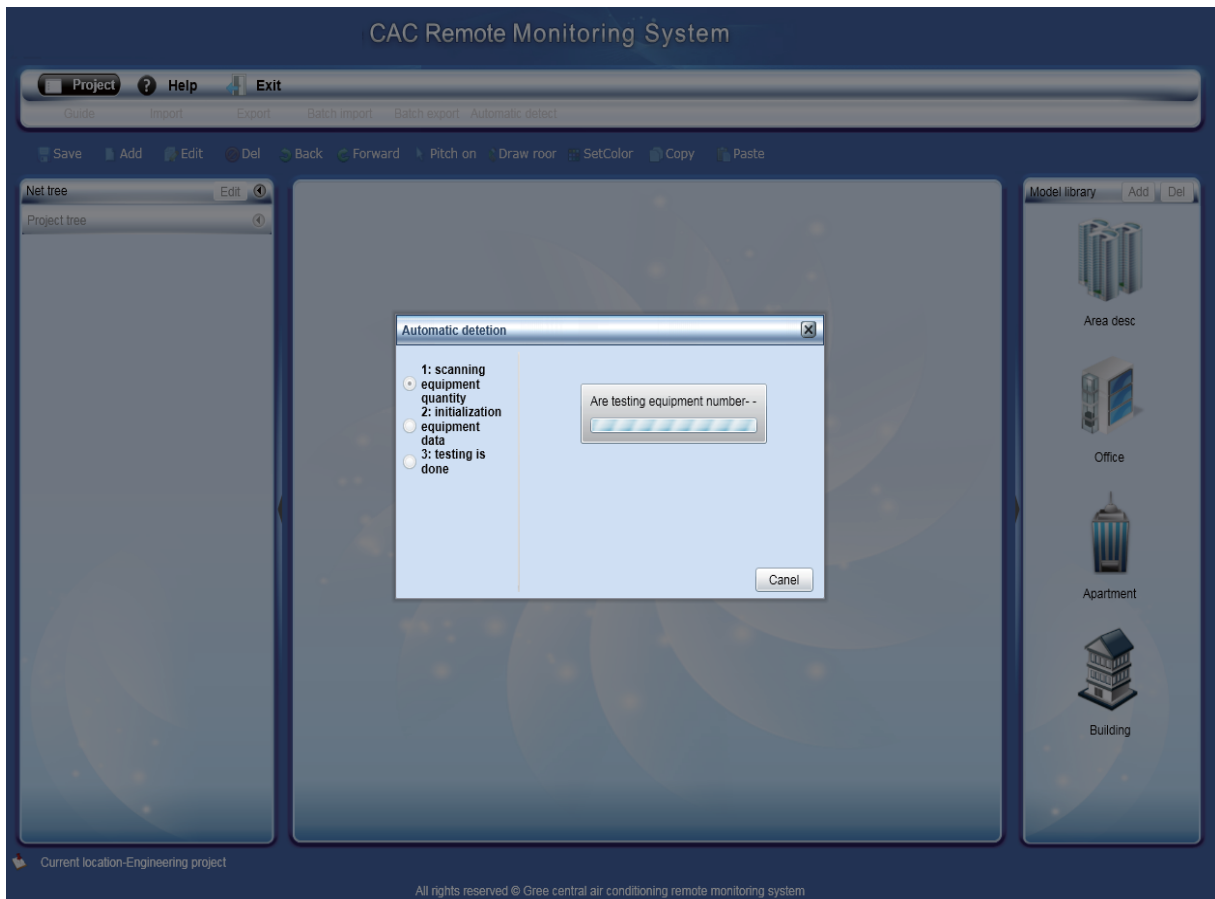


Step 3: Log in the CAC Remote Monitoring System

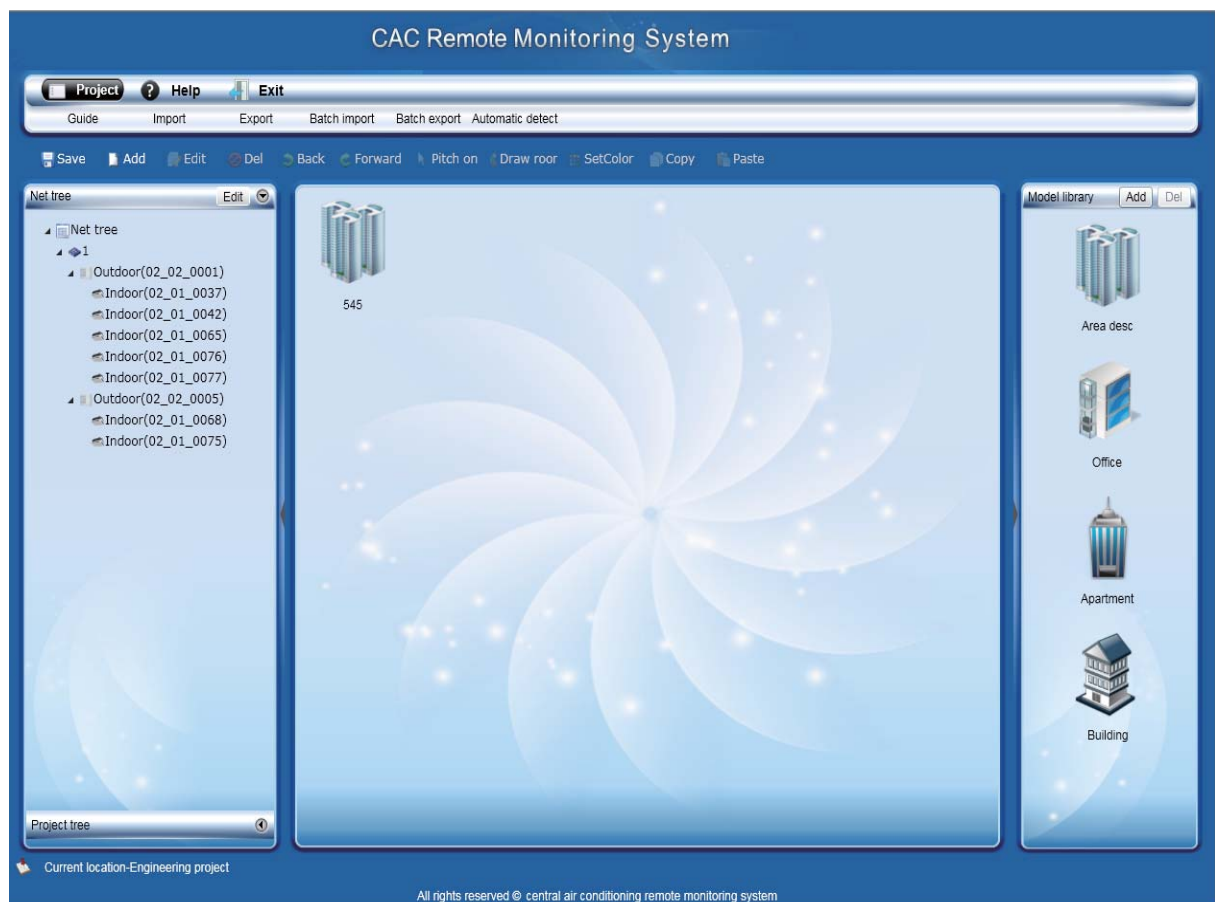


Step 4: Enter the Visual Config interface. Click “Automatic detect”





After the detection, the detected equipment will be shown below the Net tree. Communication debugging is completed.





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