




GMV BACnet Gateway Technical Service Manual


Safety Notice

Dear customer,

Please read this manual carefully prior to installation and operation and strictly observe all installation and operation instructions covered in the manual.

Special attentions shall be paid to the following marks:

 **WARNING.** This mark indicates operation, which if improperly performed, might lead to the death or serious injury of the users.

 **CAUTION.** This mark indicates operation, which if improperly performed, might possibly result in damage to the device.

 **WARNING**

1. Installation shall be performed by the qualified personnel; otherwise it would result in a fire hazard or electric shock.

2. Do not place the plug of the power supply into the socket before it is dried and cleaned.

3. Cut off the power supply before touching the electric element.

4. Do not touch this device with wet hands; otherwise it would result in electric shock.

5. Do use the power cable specified in this manual; otherwise it would result in a fire hazard.

6. When the power cable is reversely connected or the power supply is beyond the rated range, it would result in a fire hazard or even damages to this device.

7. Do install this device inside the electric control cabinet which is located indoor and then is locked.

8. Do install this device where it will not be subject to the electromagnetic interference or heavy dust.

 **CAUTION**

1. Be sure the specified adaptor is used; otherwise this device would work improperly or even be damaged.

2. Be sure this device is setup in place; otherwise it would result in communication fault.

3. Be sure the communication line is connected to the correct interface; otherwise it would result in communication fault.

4. After connection, lines should be protected with insulating tape to avoid oxidation and short circuits.

5. Normal working conditions for BACnet gateway: ①Temperature: -20~+70°C, ②Humidity: less than 85%; ③Location: install this product in the electric control cabinet, not subject to direct sunlight, rain and snow etc.

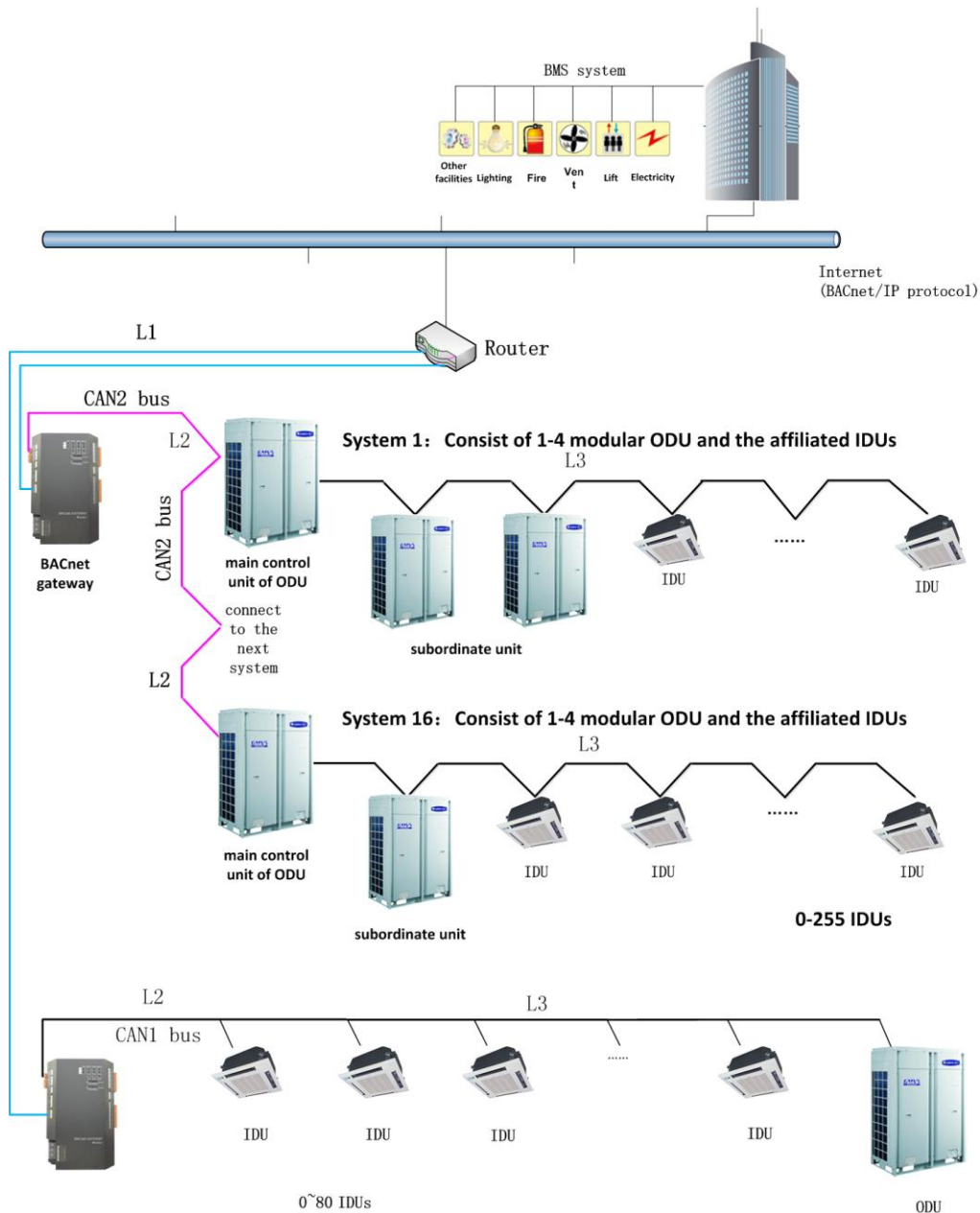
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PART I INSTALLATION

1. SYSTEM OVERVIEW

GMV BACnet gateway plays a role in connecting intranet of air conditioners (CANbus) and BMS, providing standard BACnet/IP building interface and realizing real time monitor of BMS to unit condition. Through BACnet gateway, it can conduct data collection, monitor and control to the operation status of GMV air conditioner in long distance and timely give an alarm once malfunction occur. The air conditioning maintenance staffs do not need to conduct setting and management to every unit on site in person, instead, they can check the operation status, start and operation, and have temperature setting of building air conditioning system by just sitting in front of the computer, which not only greatly enhances work efficiency, but also decreases human cost and lower management cost.



Internet topological graph specification

CAN2 bus internet: the red wire is CAN2 bus, which is consist of BACnet gateway and main control ODU of the system. One CAN2 internet can be connected to maximum 16 systems and 255 IDUs.

CAN1 bus internet: the black wire is CAN1 bus, which is consist of BACnet gateway and all IDUs and ODUs of the system. One CAN1 internet can be connected to maximum 80 IDUs.

System: one system is consisting of a set of ODU (a set of ODU is a module which is consist of 1-4 modules, namely 1-4 ODUs) and the affiliated IDUs.

The admissible unit quantity for BACnet gateway: one BACnet gateway can be connected to maximum 16 systems and 255 IDUs.

Note: L1 in the fig is the standard network cable, L2 and L3 is the twisted-pair.

2. ASSEMBLY INTRODUCTION

2.1 ASSEMBLY LIST

2.1.1 SAFETY REQUIREMENT FOR ENGINEERING INSTALLATION CONSTRUCTION

Name	Model	Material code	Supply range	Remark
BACnet gateway kit	Gateway component ME30-24/D4(B)	MC20001300	Standard configuration	It can connect to BMS system. Protocol interface: CAN and BACnet protocol Hardware interface: CAN port and Ethernet port. Main component: BACnet gateway and specification
Power cord	--	--	Free configuration	0.5mm ² --1mm ²
Communication cord	--	--	Free configuration	2×0.75mm ²

2.2 GATEWAY ME30-24/D4(B)

2.2.1 FUNCTION INTRODUCTION

GMV BACnet gateway kit ME30-24/D4(B) is intended to realize the data exchange between the air conditioning unit and BAS system, and providing standard BACnet/IP building interface and 10 I/Os (five inputs are DI1, DI2, DI3, DI4, DI5 and five outputs are DO1, DO2, DO3, DO4, DO5). DI1 is the fire alarm interface. The status of other I/Os are mapped to the specific objects of the BACnet/IP bus and are defined by the user. This gateway applies to the GMV using CAN protocol.

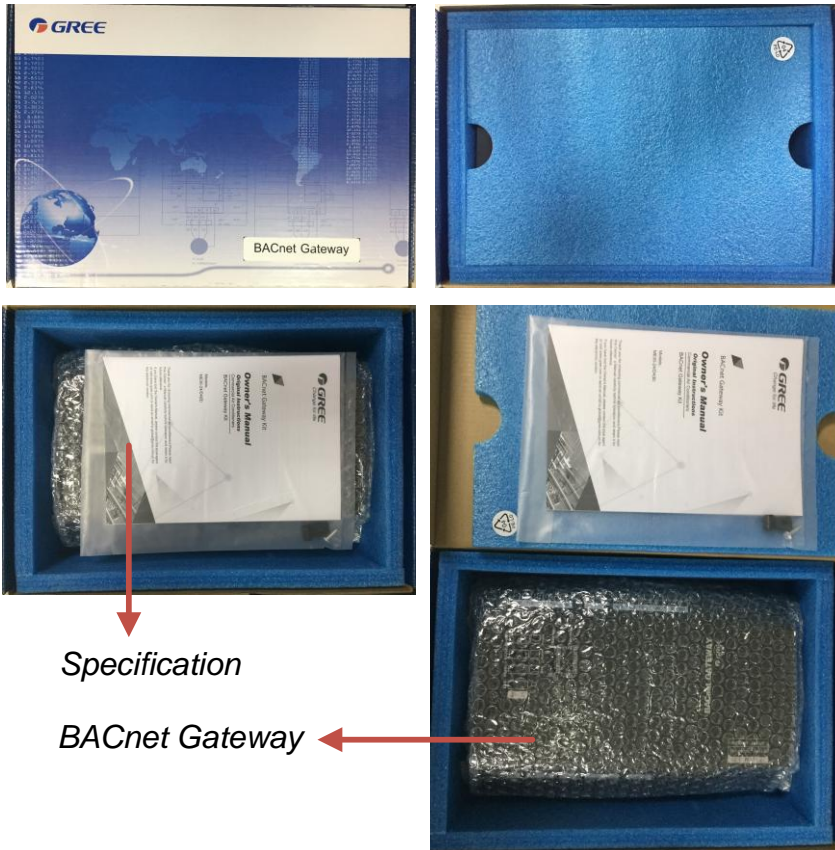
2.2.2 APPEARANCE PICTURE



2.2.3 ASSEMBLY

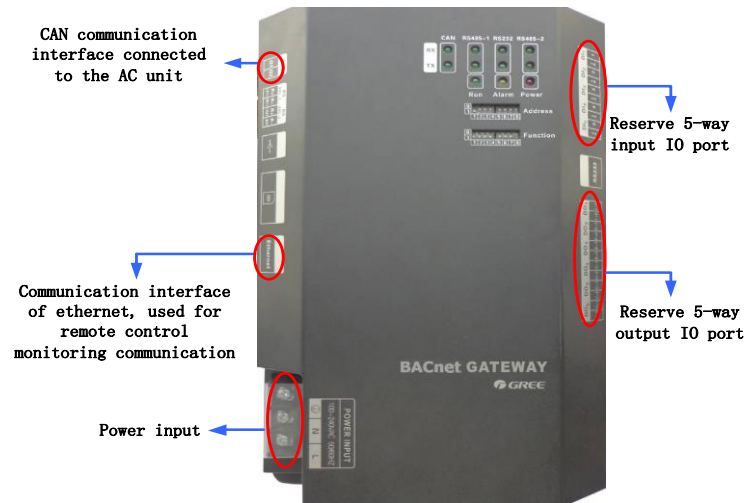
GMV gateway ME30-24/D4(B) includes the following components:

BACnet gateway	1 set
Specification	1 set



2.2.4 INTERFACE

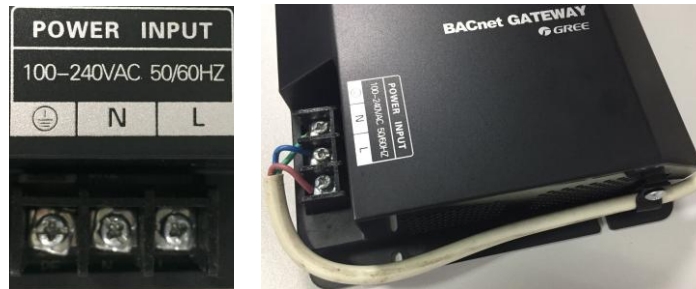
1) Diagram of interface



2) Power

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

⚠ WARNING! The ground protection of power input port must be connected; otherwise it might be dangerous; besides, when the gateway is energized, don't touch the power input.



Note: the power cord shall be fixed with bonding clamp in the kit, as shown in the fig.

3) Communication interface



CAN communication interface: connect it to the AC unit through the 2-core communication line to realize the communication between BACnet gateway and the AC which adopts CAN protocol.

RS485-1 communication interface: this device will not use this communication interface temporarily.

RS485-2 communication interface: this device will not use this communication interface temporarily.

USB and SD card interface: this device will not use this interface temporarily.

Ethernet interface: realize communication through network cable and BMS.

the routing shown is for reference only.

3.2 COMMUNICATION CONNECTION

BACnet gateway communication system includes:

- (1) The communication between BACnet gateway and BMS;
- (2) The communication between BACnet gateway and AC units.

3.2.1 MATERIAL SELECTION FOR COMMUNICATION LINE

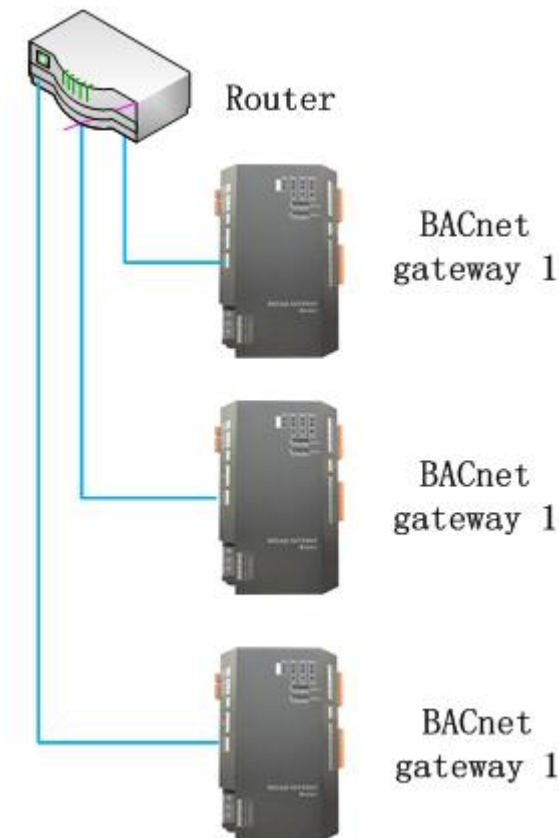
(1) Model selection of BACnet gateway and BMS communication line shall use standard Ethernet communication line, the length of network cable between gateway and router (computer, switchboard, etc.) shall not exceed 80m;

(2) Communication line model selection for BACnet gateway and AC unit

Wire type	Communication line between gateway and AC units(m)	Wire diameter(mm ²)	Wire standard	Remark
Light-weight/normal PVC jacket twisted copper wire(RVV)	$L \leq 500$	$\geq 2 \times 0.75$	GB/T 5023.5-2008	Total communication length shall not exceed 500m

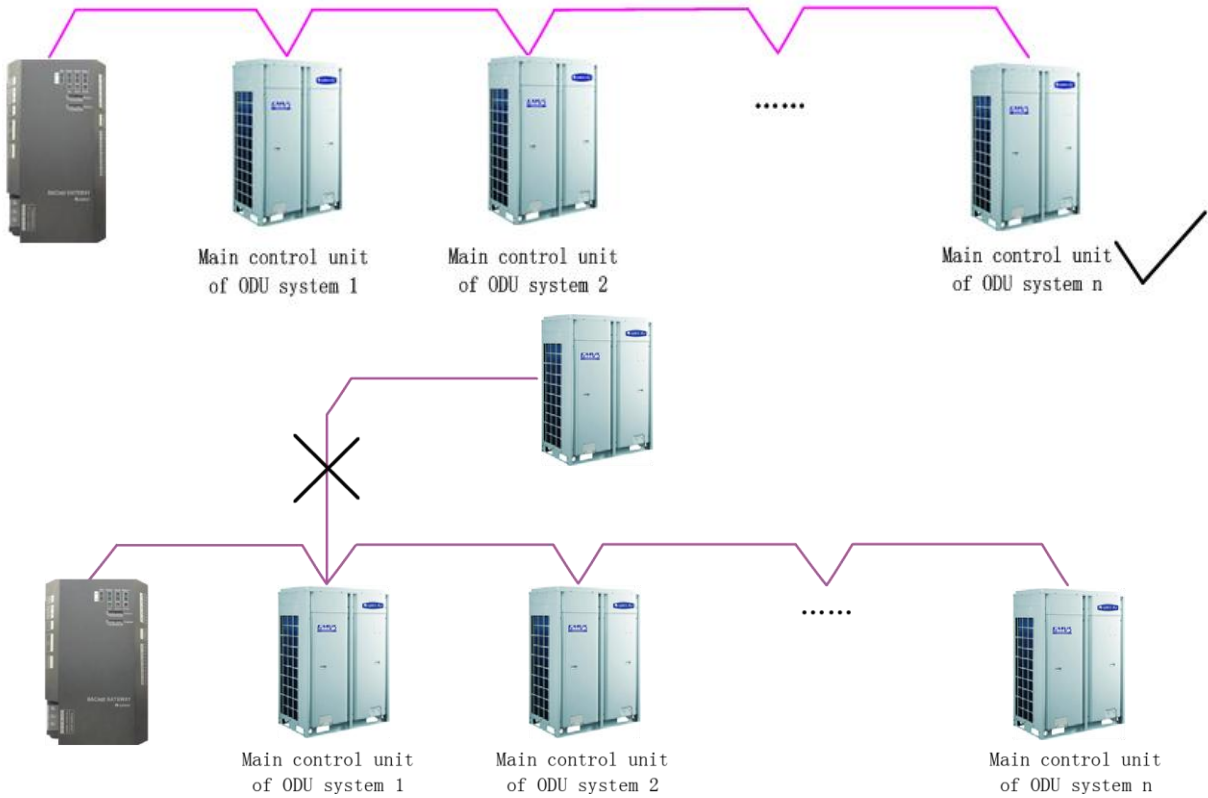
3.2.2 COMMUNICATION CONNECTION METHOD

(1) Communication connection between BACnet gateway and BMS.



(2) Communication connection between BACnet gateway and AC units (n is the quantity of ODU system, $n \leq 16$);

! Notice! All communication connection lines under BACnet gateway must be in series connection, star connection shall not be adopted.



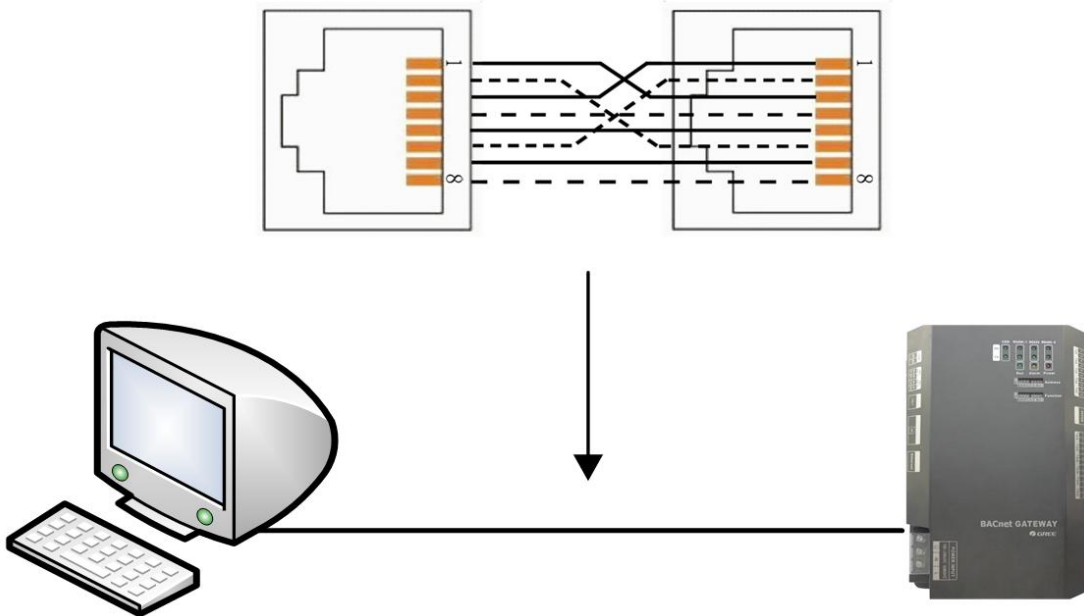
3.2.3 COMMUNICATION CONNECTION STEP

(1) Communication line connection between BACnet gateway and PC;

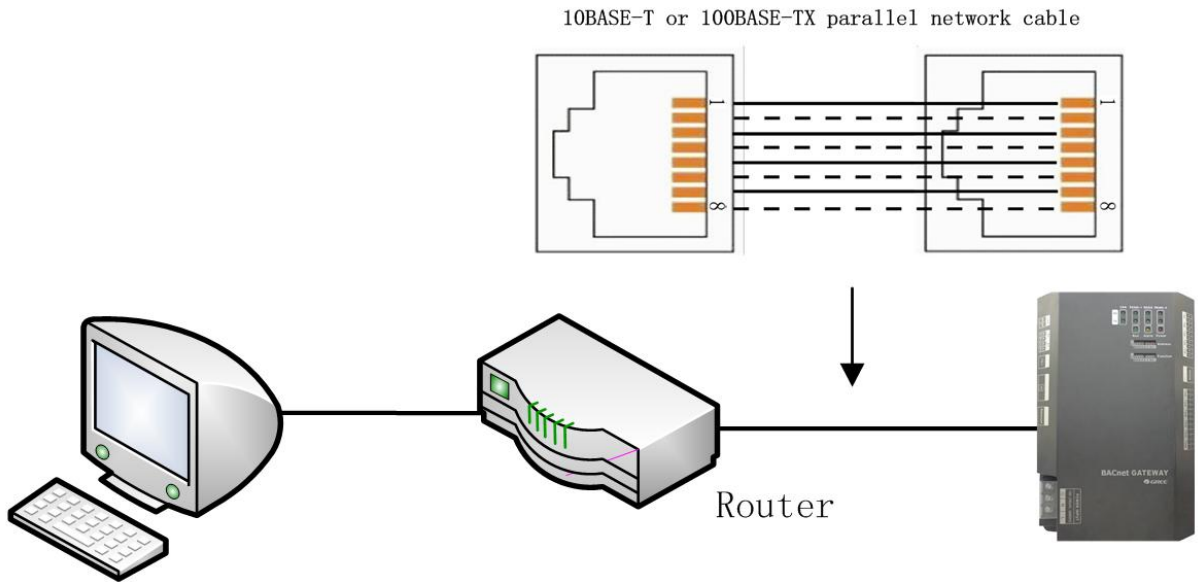
Connection diagram between BACnet gateway and PC use side:

1) Adopt cross connection network cable, BACnet gateway shall directly connect to PC.

10BASE-T or 100BASE-TX cross network cable

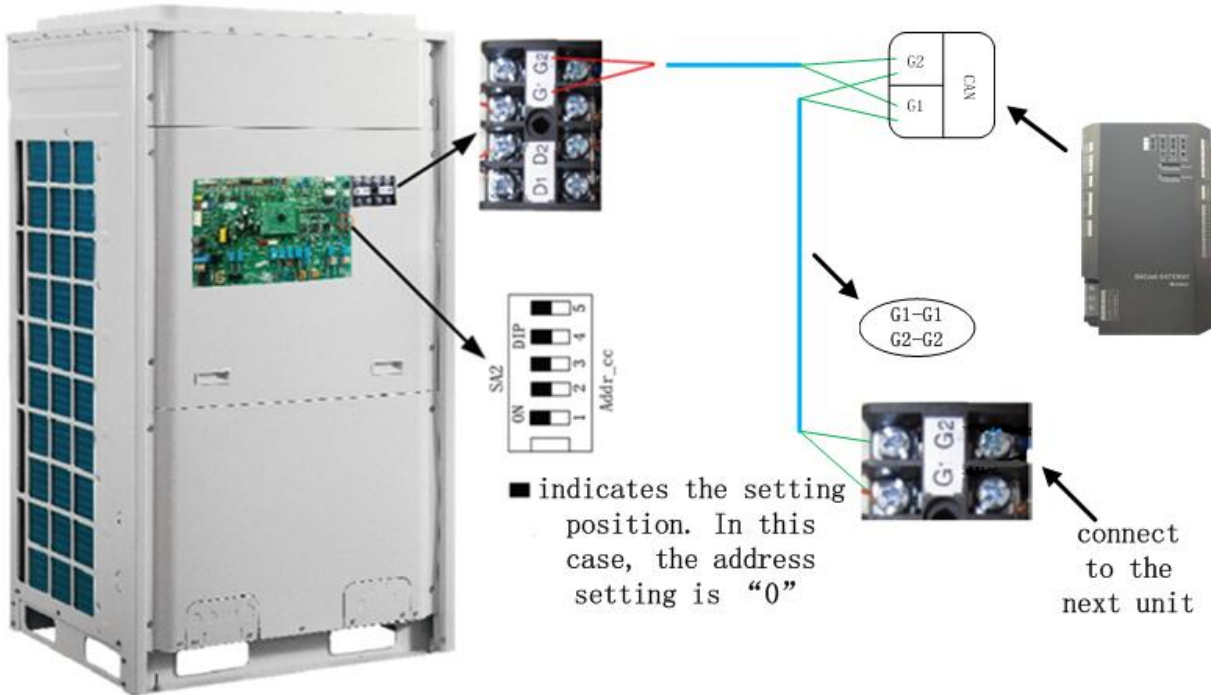


2) Adopt parallel network cable, BACnet gateway shall go through router to connect to PC.



(3) Communication line connection between BACnet gateway and AC units:

When gateway is connected to main control unit of ODU, ODU with the address dial-up of 0 must be connected.



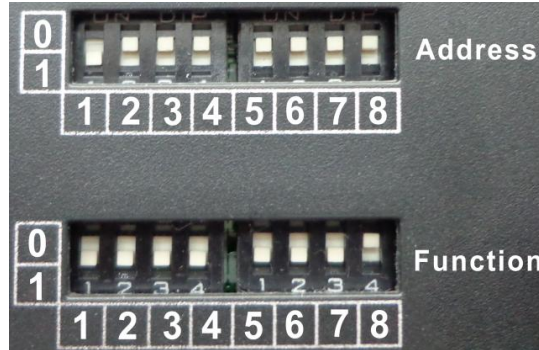
PART II DEBUG OPERATION

1. HARDWARE DEBUG

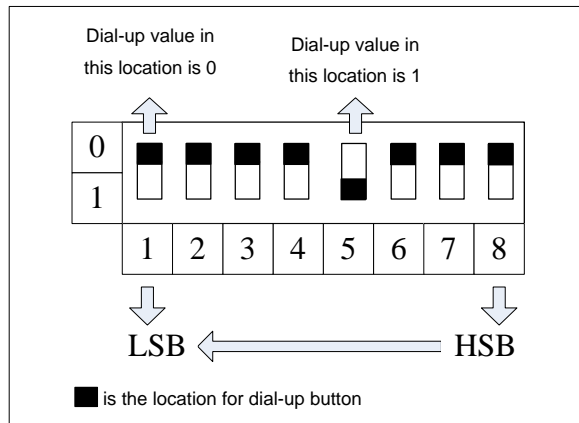
1.1 DIAL-UP SETTING

! Notice! Before using this device, please conduct dial-up setting first; otherwise the unit will not function normally!

Gateway dial-up setting area is consisting of address dial-up machine and function dial-up machine.

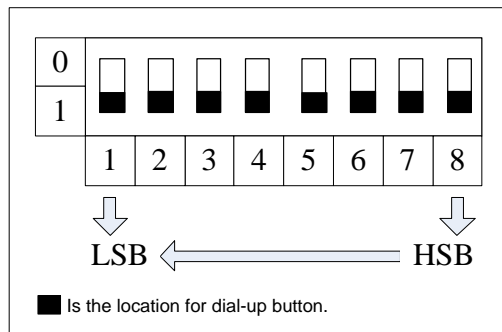


1) Diagram of dial-up machine



2) 8 address dial-up buttons——gateway reset configuration

If information such as BACnet gateway IP address configured on the webpage, subnet mask, default gateway, gateway name and gateway ID are mistaken, and the webpage cannot be visited, dial up the 8 address dial-up buttons to “1”, after all indicating lights (except power indicating light) are blinking, reset the dial-up button and restart the gateway, then the default information in gateway manufacture setting can be restored.



3) No.8 functional dial-up machine——matched resistance setting of CAN bus

! Notice!

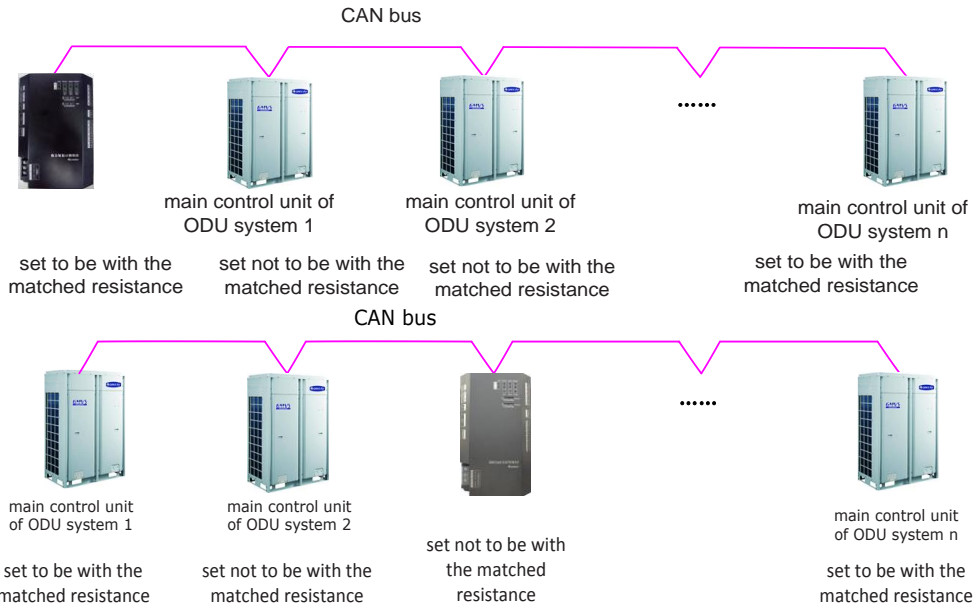
Main control ODU or gateway at the top/end of CAN bus must be with matched resistance; otherwise the communication might be wrong!

※CAN bus: specific meaning shall refer to the specification Internet topological graph.※

The No.8 dial-up button in function dial-up machine shall be used in the setting in the matched resistance of CAN bus in this gateway.

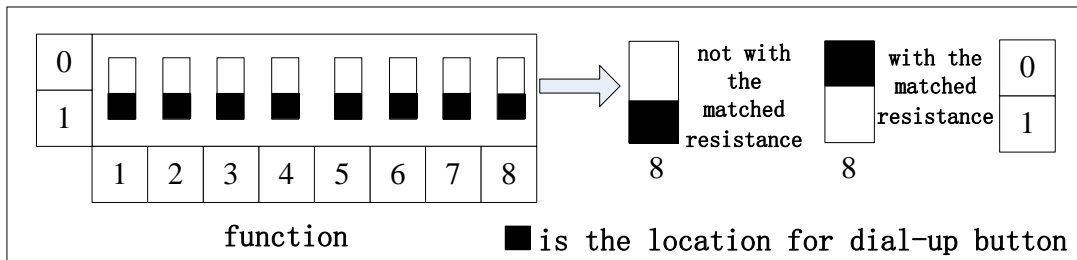
When the gateway is at the top/end of CAN bus, the gateway shall be with the matched resistance, then dial the No.8 function dial-up machine to 0;

When the gateway is not at the top/end of CAN bus, the gateway is not with the matched resistance, then dial it to 1.

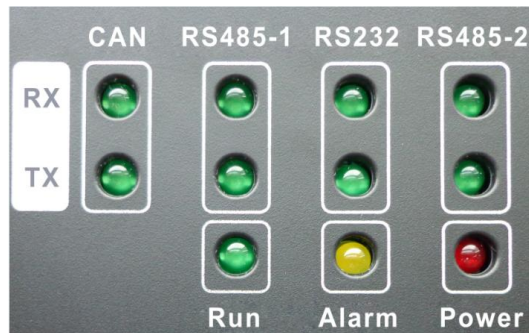


n stands for the quantity of ODU system, $n \leq 16$.

Dial-up setting graph for the matched resistance:



1.2 LED DISPLAY



The above LED indicator is mainly consisting of two parts: status indicator (run, alarm, power) and communication indicator (CAN, RS485, RS2332). The following table is the working status of each indicator.

CAN	RX	When receiving the data of equipment (eg. AC unit) which connects to BACnet gateway, it blinks.
CAN	TX	When transmitting data to the equipment (eg. AC unit) which connects to BACnet gateway, it blinks.
RS485-1	RX	This device does not use this LED indicator.
RS485-1	TX	This device does not use this LED indicator.
RS232	RX	This device does not use this LED indicator.
RS232	TX	This device does not use this LED indicator.
RS485-2	RX	This device does not use this LED indicator.
RS485-2	TX	This device does not use this LED indicator.
Power		When power supply of BACnet gateway is normal, it is on.
Run		When BACnet gateway is running normally, it blinks.
Alarm		This device does not use this LED indicator.

1.3 DI/DO



So far, this gateway supports 5 DIs (digital input) and 5 Dos (digital output), DO6 is reserved.

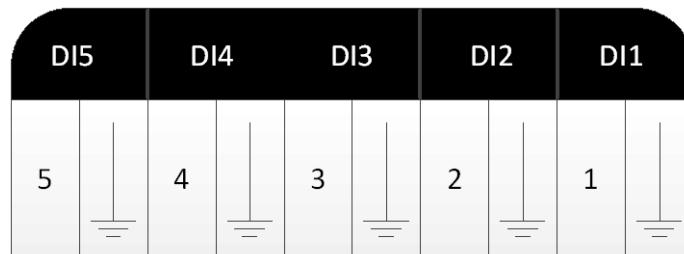
DI1...DI5

Digital input 0/1 digital signal (binary system), apply to active input.

DI 1: in CAN2 network, fire alarm signal, connect “1” to the power of 12V, input fire alarm signal “1” in DI 1 port, then BACnet gateway will give out control, all units stop operation immediately; disconnect “1” or connect to “0”, input signal “0” in DI 1 port, resume operation of all ODUs.

In CAN1 network, fire alarm signal, connect “1” to the power of 12V, input fire alarm signal “1” in DI 1 port, then BACnet gateway will give out control, all units stop operation immediately; disconnect “1” or connect to “0”, input signal “0” in DI 1 port, resume operation of IDUs manually.

DI 2...DI 5: Defined by the user.



DO1...DO5

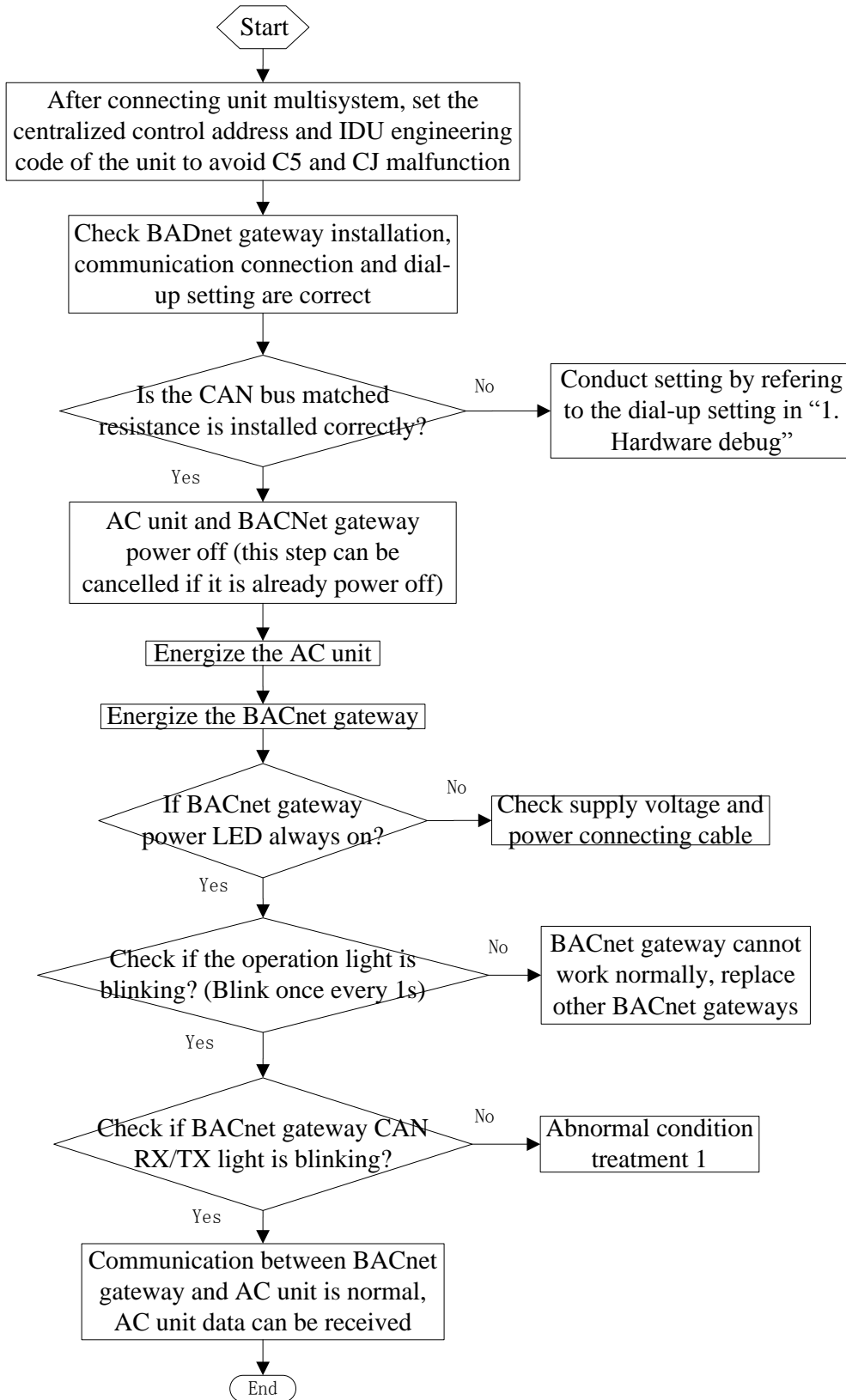
Digital output Relay output, turn on the contactor oftentimes

Maximum admissible electric quantity: 250VAC, 3A; 30VDC, 3A

Usage example: Input “1” in DO 5 of BACnet protocol, the two contactors of DO5 relay will close; input “0” in DO 5 of BACnet, the two contactors of DO 5 will cut off.

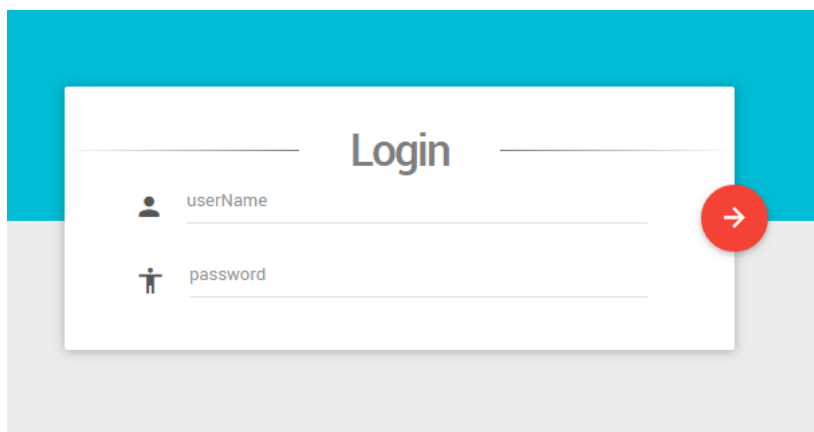
2.COMMUNICATION DEBUG

2.1 COMMUNICATION DEBUG WITH AIR CONDITIONING EQUIPMENT

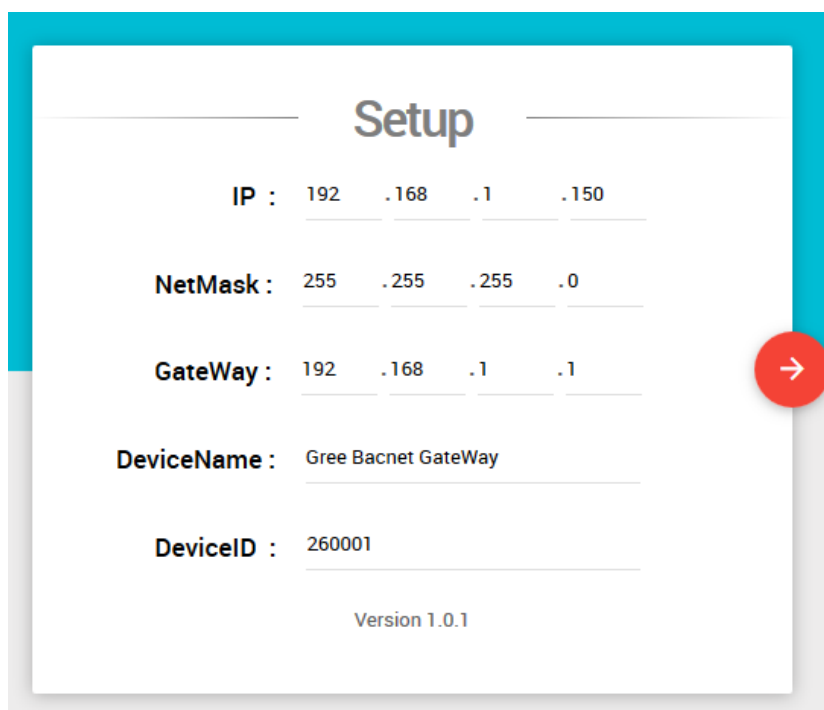


2.1.1 BACnet GATEWAY CONFIGURATION

One BACnet gateway connects 16 systems and 255 IDUs at the same time. The gateway parameter shall be configured after its installation, however, before this please set the IP address of the PC the same with that of the BACnet gateway, see Attachment A; then open browser (IE10 or higher, Firefox or Google), input the default IP address into the address field: `http://192.168.1.150`, the default user name and password are both “config”; refer to the following fig.



After input, press the button to go to the setting page.



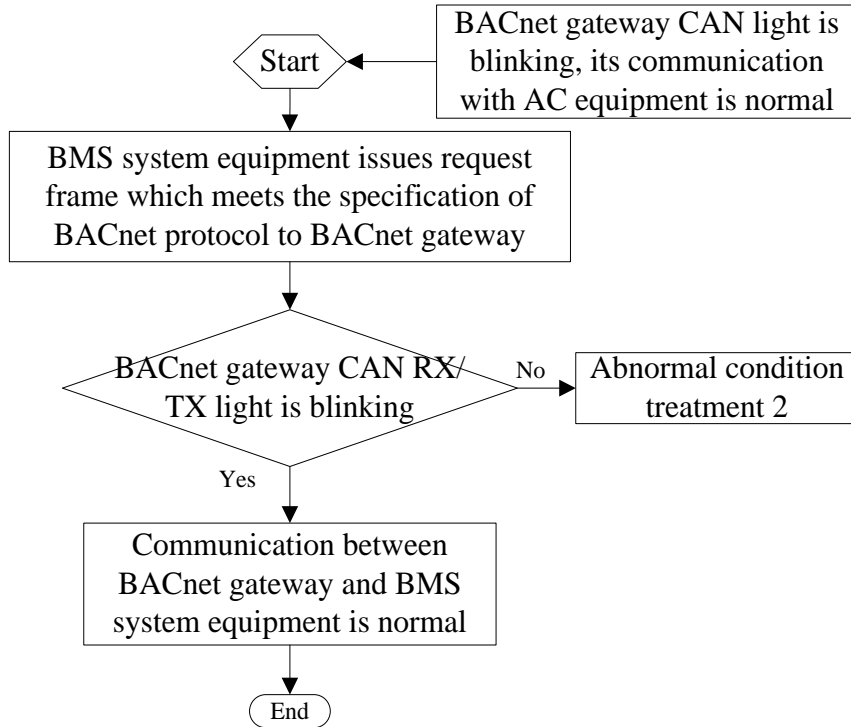
The configurable parameters include BACnet gateway IP address, gateway subnet mask, gateway default gateway, gateway name, gateway ID. The user can conduct configuration at his will, after that, click button and it will take effect after resarted Gateway.

2.2 COMMUNICATION DEBUG WITH BMS SYSTEM EQUIPMENT

Protocol interface: BACnet protocol

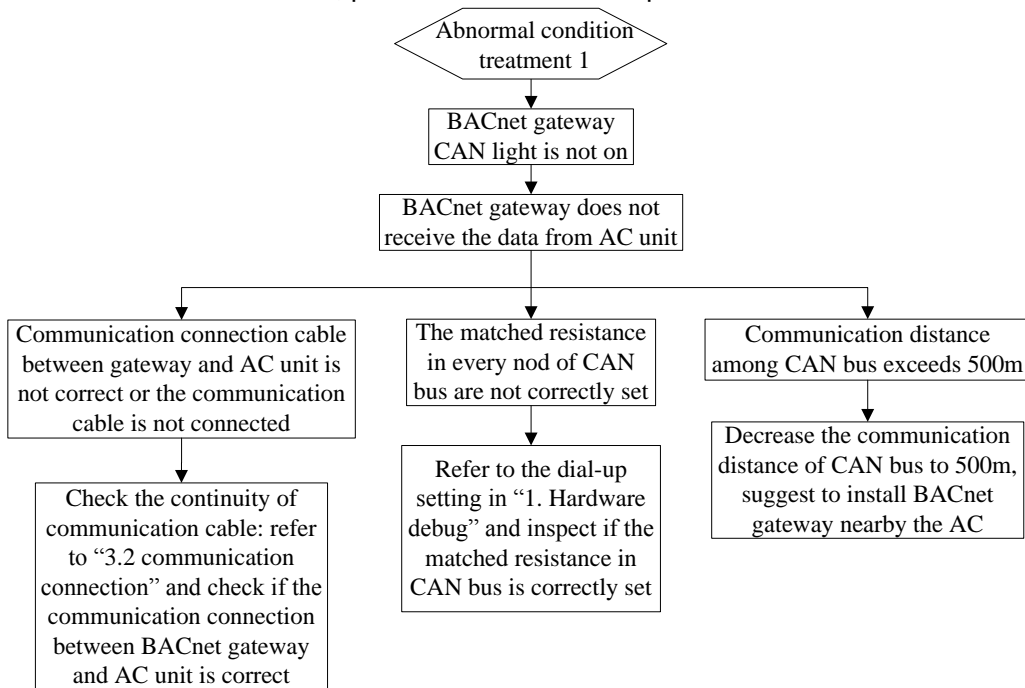
Hardware interface: Ethernet

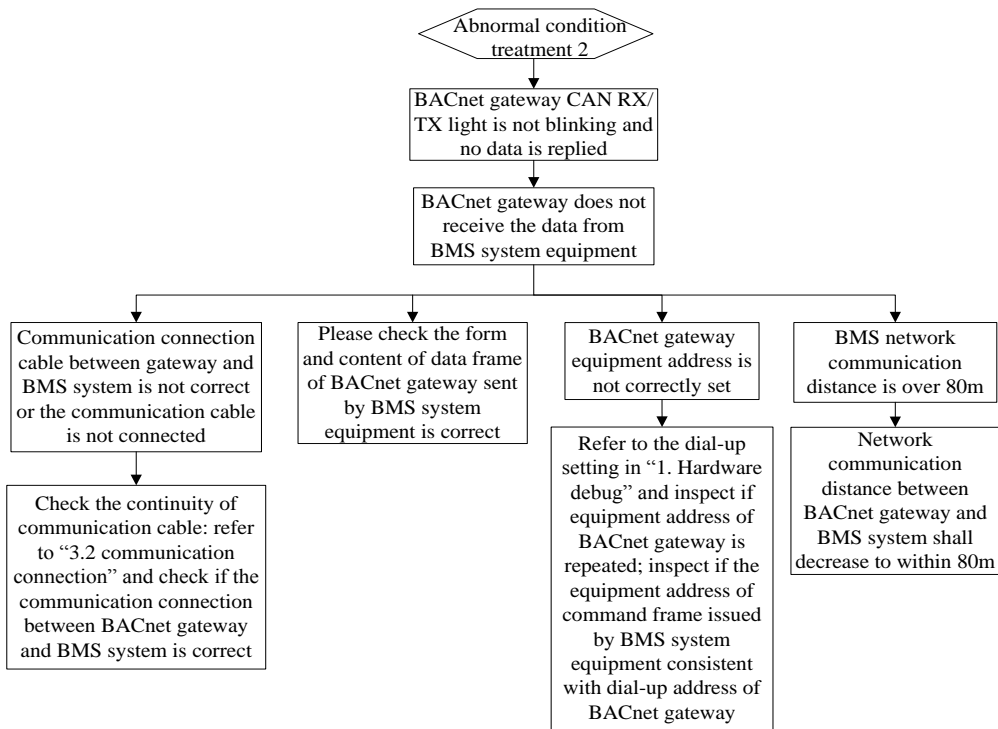
Protocol shall refer to the specification.



2.3 EXCEPTION HANDLING

Note: Here are several reasons and troubleshooting methods for exception handling under exception conditions. If not solved, please contact relevant professional Gree staff.





PART III MAINTENANCE

1.COMMON TROUBLESHOOTING OF BMS SYSTEM

Malfunction	Possible reason	Troubleshooting
According to the protocol provided, BMS system will display communication malfunction warning, but operation status of some or all units cannot be shown, neither conduct any control	Twisted pair communication cord is not used	Change to twisted pair communication cord
	BACnet gateway is damaged	Replace the BACnet gateway
	Communication cord is disconnected	Weld the disconnected circuit
	Communication cord short circuit	Maintain the short circuit parts
	The twisted-pair and communication cord is too close (less than 15CM), communication malfunction occur due to disturbance	Conduct separate wiring for these two wires, consider to add shielded steel tube if the separation distance cannot be over 15CM
	Connection of communication interface is wrong	Connect it according to the specification in this manual
Circuit inspection is in good condition, but no information displayed in all or some units, communication malfunction still exists in the software	After replacing the chip or re-dial-up the ODU and before re-energizing the unit, it is not power off.	Re-energize the unit
	Matched resistance is not connected	Conduct correct setting to the matched resistance
	Series port used in communication software is inconsistent with that connected to the computer	Replace series port or change the series port in the software
	Unit address added in the software is inconsistent with that of actual unit	Revise the address setting in software unit
	The unit is not energized	Energize the unit
	Forgot to insert chip in ODU or IDU, or insert direction of chip is opposite with the actual direction	Reinspect the plug-in chip, insert it in the direction of the gap in PCB, and re-energize it.
	Unit address is wrong or repeated	Revise the wrong unit address setting
Circuit, equipment and engineering installation inspection is in good condition, communication malfunction still exists in the software	Displayer or controller which is inconsistent with actual unit is adopted	Check the specification of current controller and wired controller and replace it if not consistent.



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GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI

Add: West Jinji Rd, Qianshan, Zhuhai, Guangdong, China, 519070

Tel: (+86-756) 8522218 Fax: (+86-756) 8669426

E-mail: gree@gree.com.cn www.gree.com

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