![GREE - Change for life]

Modbus Gateway
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.

Contents

1 General

GREE 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 Gree 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 GREE GMV5 DC inverter system, GMV5S all DC inverter system and GMV water-source DC inverter heat pump 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

CAN Interface,to the
air conditioning system

RS485-1 Interface,
to Gree Web-based Remote
Monitoring and Control System/BMS

Digital Input

Digital Output
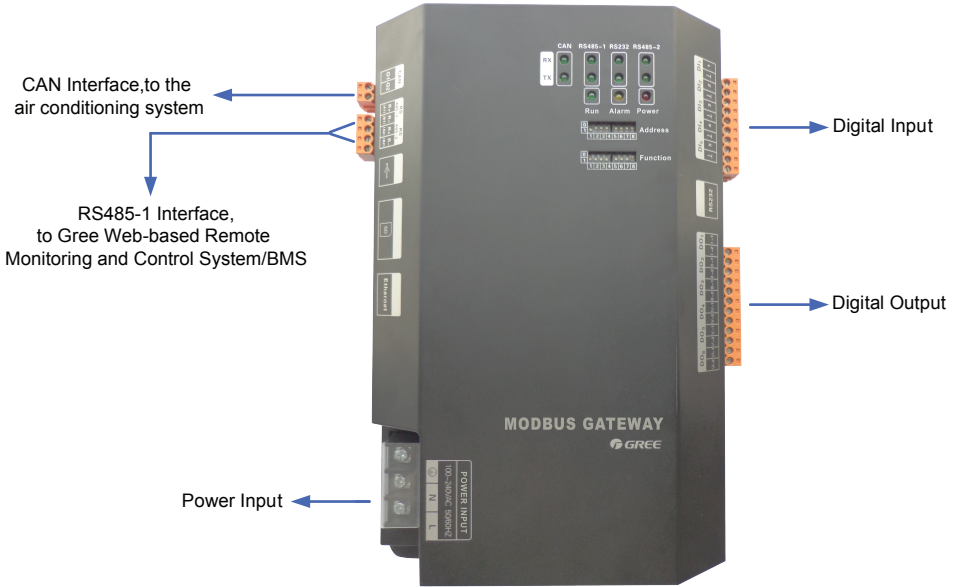
Power Input

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 Gree Web-based Remote Monitoring and Control System/BMS through twisted pairs so as to get through the communication between the Modbus gateway and the Gree Web-based Remote Monitoring and Control System/BMS.
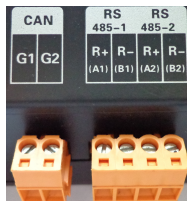
RS485-2 Interface: it is reserved .

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.
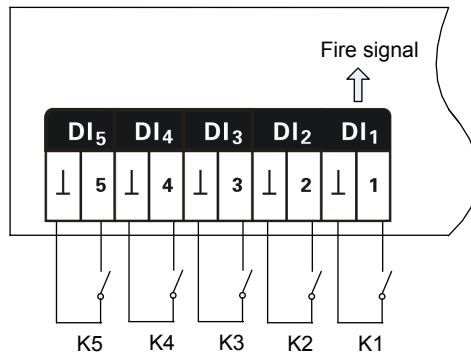
DO1...DO5

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.
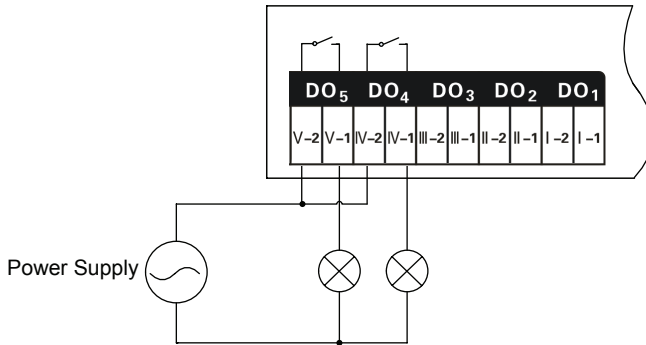
3.2 Indicating LED
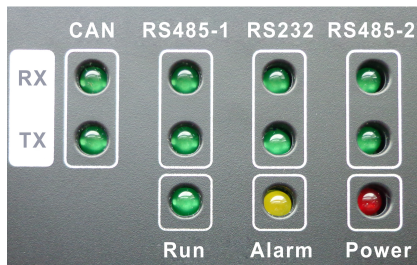
CAN	RX	It flashes when the gateway receives data from the target equipment (like, the air conditioning system).
	TX	It flashes when data is communicated to the target equipment (like, the air conditioning system).
RS485-1	RX	It flashes when the gateway receives data from the monitoring PC or BMS.
	TX	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.
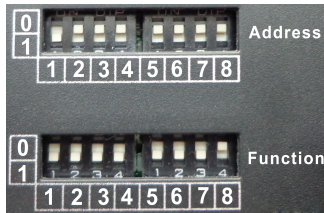
3.3.1 Structural Drawing of the DIP Switches

■ Projecting lever
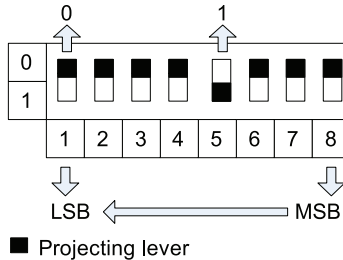
3.3.2 Address DIP Switch

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:

Address Code								
Address DIP								Add
1	2	3	4	5	6	7	8	
1	1	0	1	0	0	0	0	11

Address DIP

How to Set Address 43:

Address Code								
Address DIP								Add
1	2	3	4	5	6	7	8	
1	1	0	1	0	1	0	0	43

Address DIP
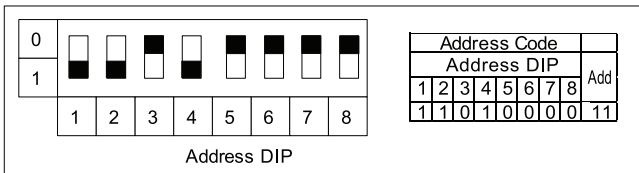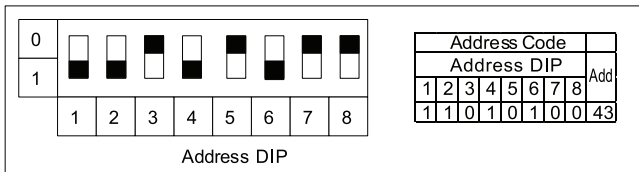
3.3.3 Function DIP Switch-CAN Bus Matched Resistance Setting
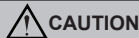
⚠ CAUTION
The master outdoor unit of air conditioning system 1 or the gateway located at either end of the CAN2 bus (see the topological drawing in Section 4.3) should include a matched resistance; otherwise the normal communication would fail.

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".

CAN2 Bus

Master outdoor unit of modular group 1

Matched resistance required

Master outdoor unit of modular group 2

Matched resistance required not

Master outdoor unit of modular group 16

Matched resistance required not

Matched resistance required

How to Set the Matched Resistance:

Function

Without the matched resistance

With the matched resistance

Projecting lever
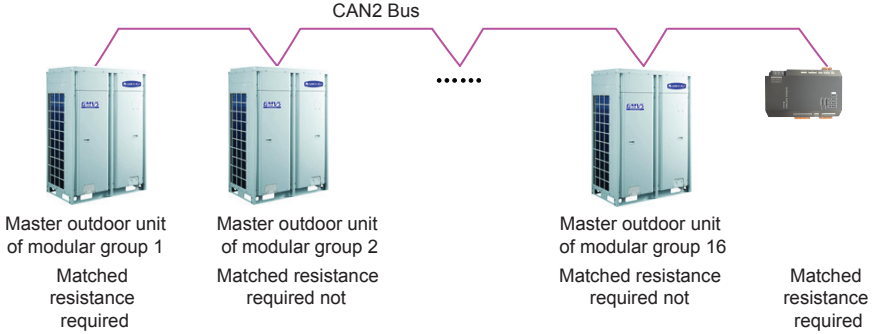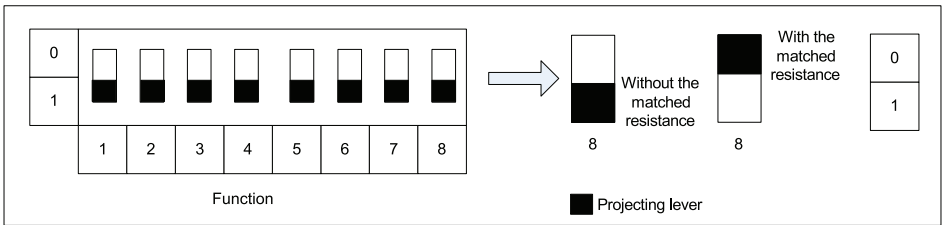
3.3.4 Function DIP Switch-RS485 Bus Matched Resistance Setting

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.

Function

Without the matched resistance

With the matched resistance

Projecting lever
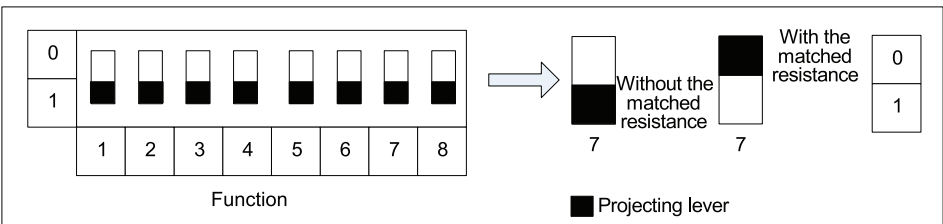
3.3.5 Function DIP Switch-First Indoor Unit No. Setting

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

One gateway is capable of supporting a maximum of 16 groups of outdoor units (each group includes up to 4 outdoor units) and 128 indoor units. When the number of indoor units exceeds 128, another Modbus gateway is required and then a total of 255 indoor units are accessible.

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:
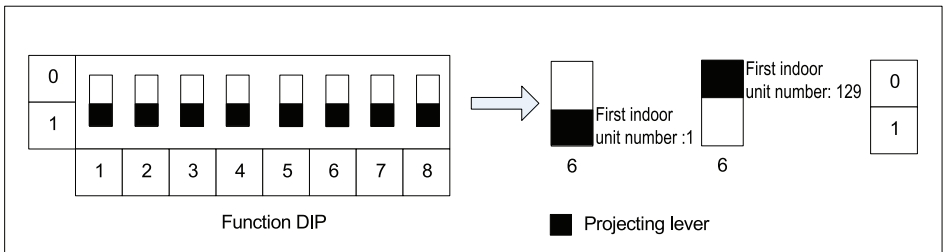
4 Applications

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

4.1 Gree Web-based Remote Monitoring and Control System

The Modbus gateway is applicable to be used to integrate the air conditioning system, including GMV5 DC inverter system, GMV5S all DC inverter system, and GMV water-source heat pump system, with the Gree 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. Gree 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 GMV5 DC inverter system, GMV5S all DC inverter system, and GMV 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

Either Gree Web-based Remote Monitoring and Control System or BMS

Internet

Gree Web-based Remote Monitoring and Control System (server side)

BMS

Other device   Lighting   Fire   Vent   Lift   Electricity

Gree Web-based Remote Monitoring and Control System (client side)

R1

RS232-RS485 Converter

Modbus bus   L1

L2

CAN2 bus

Modbus gateway 1

Master outdoor unit 1

System 1: it consists of three outdoor units and their matched indoor units.

L3

CAN2 bus

To the next system

Slave outdoor unit 2   Slave outdoor unit 3

Indoor unit

....

Indoor unit

L2

L1

System 16: it consists of two outdoor units and their matched indoor units.

L3

Master outdoor unit 1

Slave outdoor unit 2

Indoor unit   Indoor unit   Indoor unit

....

Indoor unit

CAN2 Network 1

Modbus bus

L2

CAN2 bus

Modbus gateway 2

Master outdoor unit 1

System 1: it consists of four outdoor units and their matched indoor units.

L3

CAN2 bus

Slave outdoor unit 2   Slave outdoor unit 3   Slave outdoor unit 4

Indoor unit

....

Indoor unit

L2

Modbus gateway 3

Mater outdoor unit 1

System 2: it consists of two outdoor units and their matched indoor units.

L3

To the next system

Slave outdoor unit 2

Indoor unit   Indoor unit   Indoor unit

....

Indoor unit

CAN2 Network 2

Modbus bus

To next Modbus gateway

L1

L2

CAN2 bus

Modbus gateway 255

Master outdoor unit 1

System 1: it consists of two outdoor units and their matched indoor units.

L3

L2

To the next system

Slave outdoor unit 2

Indoor unit   Indoor unit

....

Indoor unit

8

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 2 Modbus gateways and 16 air conditining systems (each system includes at most 4 outdoor units and the total maximum allowable indoor units is 255) 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 conditioing 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 the topological diagram.

5 Installation

5.1 Product Dimensions and Dimensions of the Electric Cabinet

5.1.1 Product Dimensions

(L×W×H: 296×177×56 mm)
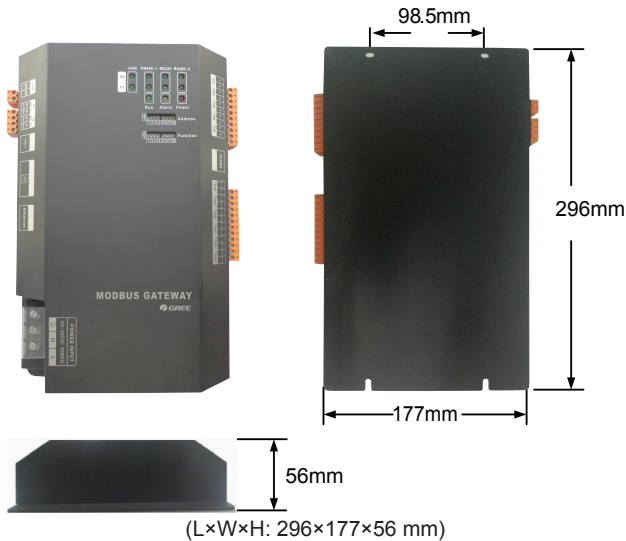
5.1.2 Dimensions of the Electric Cabinet

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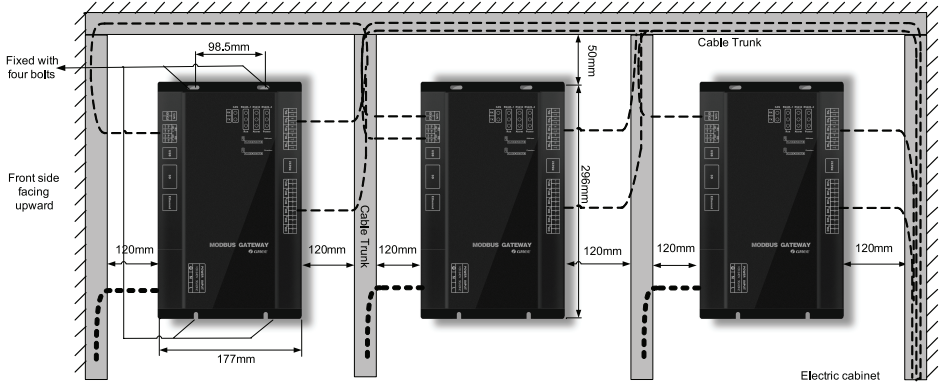
⚠ WARNING
Power lines and communication lines of the Modbus gateway should be routed separately; otherwise the Modbus gateway would fail to work.

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 Gree 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 Gree 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 (mm²)	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
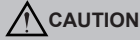
⚠ CAUTION
Only serial connection is allowed for all communication lines of the Modbus gateway. The star connection is prohibited

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

Gree Web-based Remote
Monitoring and Control System/BMS

Gree Web-based Remote
Monitoring and Control System/BMS

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

Master outdoor
unit of system 1

Master outdoor
unit of system 2

Master outdoor
unit of system n

Master outdoor
unit of system 1

Master outdoor
unit of system 2

Master outdoor
unit of system n

Master outdoor
unit of system 1

Master outdoor
unit of system 2

Master outdoor
unit of system n

"n" (n≤16) represents the quantity of the air conditioning systems.
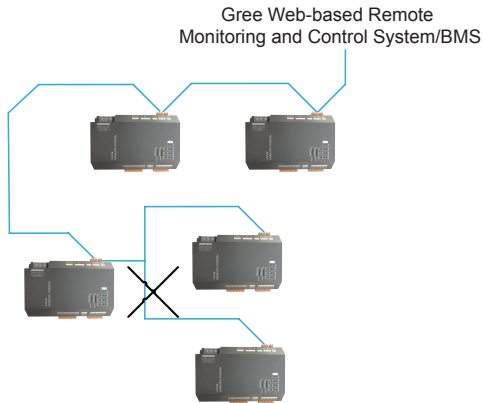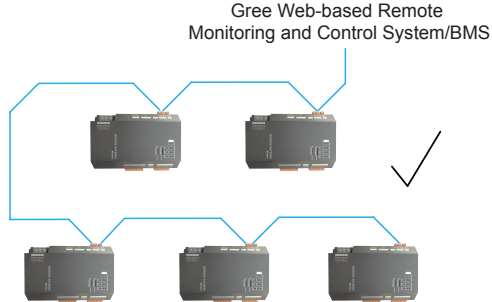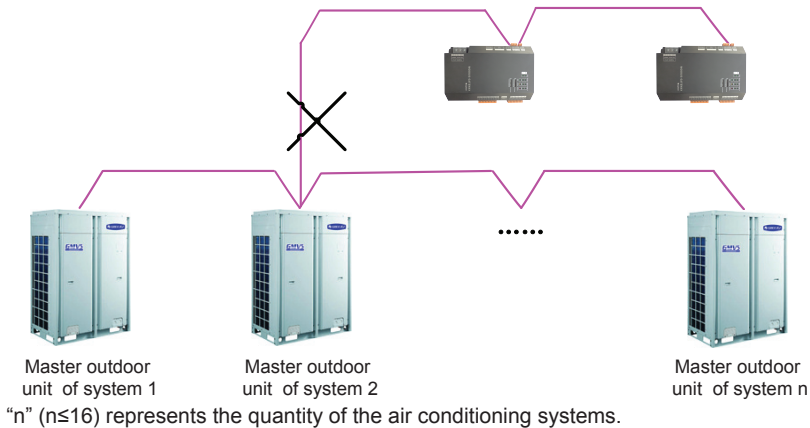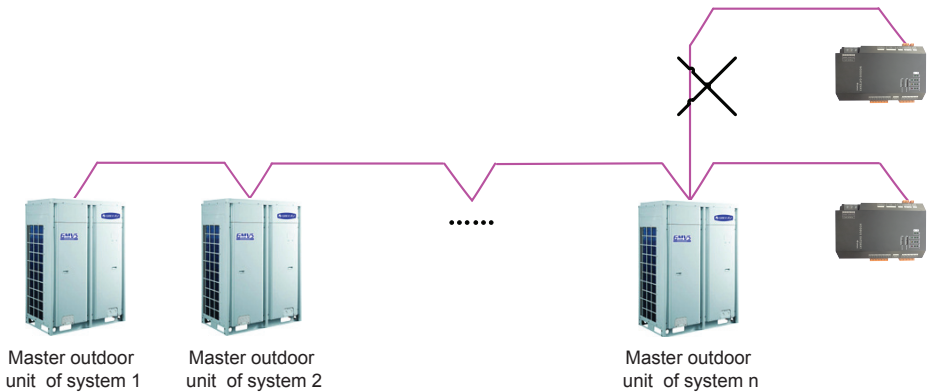
5.2.3 Connection Steps

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

Step 1: confirm the first Modbus gateway (Modbus gateway 1) to be connected to the Gree 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 deifnition 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.
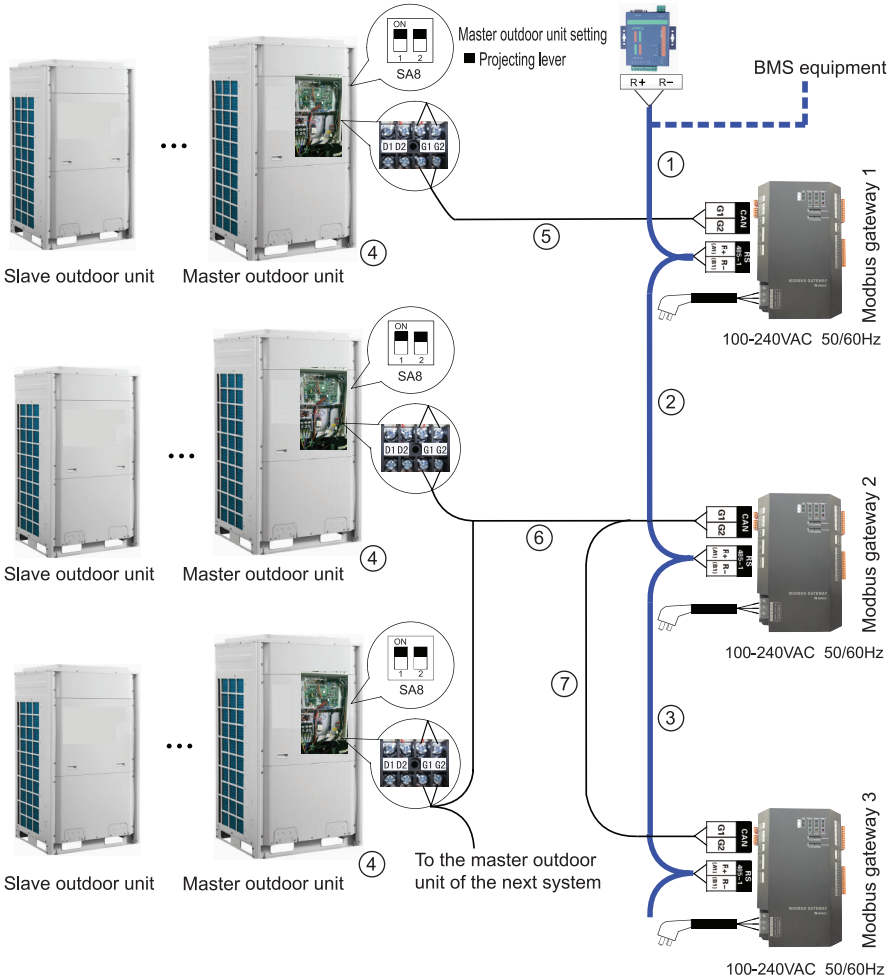
Notes:

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.
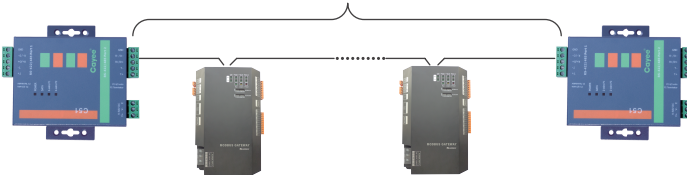
2).In the similar way as described in Section 3.3.3, the master outdoor unit located at either end of the CAN2 bus should be coupled with a matched resistance. The example listed below shows how to set the matched resistance for the GMV5 DC inverter system.

See Section 4.3 for the deifniation of the CAN2 bus.
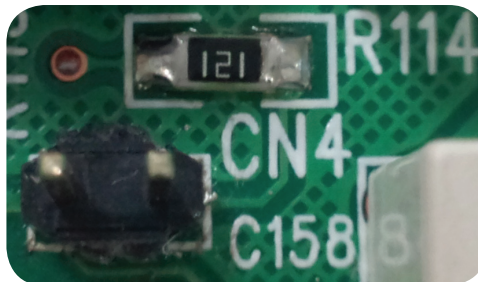
Taking the GMV5 DC inverter system for example, as shown in the figure above, there are two pins located at CN4. The jumper-shorted two pins are equivalent to a matched resistance.

Appendix A Address Codes of the DIP Switch

Address Codes 0-31									Address Codes 32-63								
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	0	0	/	0	0	0	0	0	1	0	0	32
1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	33
0	1	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	34
1	1	0	0	0	0	0	0	3	1	1	0	0	0	1	0	0	35
0	0	1	0	0	0	0	0	4	0	0	1	0	0	1	0	0	36
1	0	1	0	0	0	0	0	5	1	0	1	0	0	1	0	0	37
0	1	1	0	0	0	0	0	6	0	1	1	0	0	1	0	0	38
1	1	1	0	0	0	0	0	7	1	1	1	0	0	1	0	0	39
0	0	0	1	0	0	0	0	8	0	0	0	1	0	1	0	0	40
1	0	0	1	0	0	0	0	9	1	0	0	1	0	1	0	0	41
0	1	0	1	0	0	0	0	10	0	1	0	1	0	1	0	0	42
1	1	0	1	0	0	0	0	11	1	1	0	1	0	1	0	0	43
0	0	1	1	0	0	0	0	12	0	0	1	1	0	1	0	0	44
1	0	1	1	0	0	0	0	13	1	0	1	1	0	1	0	0	45
0	1	1	1	0	0	0	0	14	0	1	1	1	0	1	0	0	46
1	1	1	1	0	0	0	0	15	1	1	1	1	0	1	0	0	47
0	0	0	0	1	0	0	0	16	0	0	0	0	1	1	0	0	48
1	0	0	0	1	0	0	0	17	1	0	0	0	1	1	0	0	49
0	1	0	0	1	0	0	0	18	0	1	0	0	1	1	0	0	50
1	1	0	0	1	0	0	0	19	1	1	0	0	1	1	0	0	51
0	0	1	0	1	0	0	0	20	0	0	1	0	1	1	0	0	52
1	0	1	0	1	0	0	0	21	1	0	1	0	1	1	0	0	53
0	1	1	0	1	0	0	0	22	0	1	1	0	1	1	0	0	54
1	1	1	0	1	0	0	0	23	1	1	1	0	1	1	0	0	55
0	0	0	1	1	0	0	0	24	0	0	0	1	1	1	0	0	56
1	0	0	1	1	0	0	0	25	1	0	0	1	1	1	0	0	57
0	1	0	1	1	0	0	0	26	0	1	0	1	1	1	0	0	58
1	1	0	1	1	0	0	0	27	1	1	0	1	1	1	0	0	59
0	0	1	1	1	0	0	0	28	0	0	1	1	1	1	0	0	60
1	0	1	1	1	0	0	0	29	1	0	1	1	1	1	0	0	61
0	1	1	1	1	0	0	0	30	0	1	1	1	1	1	0	0	62
1	1	1	1	1	0	0	0	31	1	1	1	1	1	1	0	0	63

Address Codes 64-95										Address Codes 96-127									
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	0	64		0	0	0	0	0	1	1	0	96	
1	0	0	0	0	0	1	0	65		1	0	0	0	0	1	1	0	97	
0	1	0	0	0	0	1	0	66		0	1	0	0	0	1	1	0	98	
1	1	0	0	0	0	1	0	67		1	1	0	0	0	1	1	0	99	
0	0	1	0	0	0	1	0	68		0	0	1	0	0	1	1	0	100	
1	0	1	0	0	0	1	0	69		1	0	1	0	0	1	1	0	101	
0	1	1	0	0	0	1	0	70		0	1	1	0	0	1	1	0	102	
1	1	1	0	0	0	1	0	71		1	1	1	0	0	1	1	0	103	
0	0	0	1	0	0	1	0	72		0	0	0	1	0	1	1	0	104	
1	0	0	1	0	0	1	0	73		1	0	0	1	0	1	1	0	105	
0	1	0	1	0	0	1	0	74		0	1	0	1	0	1	1	0	106	
1	1	0	1	0	0	1	0	75		1	1	0	1	0	1	1	0	107	
0	0	1	1	0	0	1	0	76		0	0	1	1	0	1	1	0	108	
1	0	1	1	0	0	1	0	77		1	0	1	1	0	1	1	0	109	
0	1	1	1	0	0	1	0	78		0	1	1	1	0	1	1	0	110	
1	1	1	1	0	0	1	0	79		1	1	1	1	0	1	1	0	111	
0	0	0	0	1	0	1	0	80		0	0	0	0	1	1	1	0	112	
1	0	0	0	1	0	1	0	81		1	0	0	0	1	1	1	0	113	
0	1	0	0	1	0	1	0	82		0	1	0	0	1	1	1	0	114	
1	1	0	0	1	0	1	0	83		1	1	0	0	1	1	1	0	115	
0	0	1	0	1	0	1	0	84		0	0	1	0	1	1	1	0	116	
1	0	1	0	1	0	1	0	85		1	0	1	0	1	1	1	0	117	
0	1	1	0	1	0	1	0	86		0	1	1	0	1	1	1	0	118	
1	1	1	0	1	0	1	0	87		1	1	1	0	1	1	1	0	119	
0	0	0	1	1	0	1	0	88		0	0	0	1	1	1	1	0	120	
1	0	0	1	1	0	1	0	89		1	0	0	1	1	1	1	0	121	
0	1	0	1	1	0	1	0	90		0	1	0	1	1	1	1	0	122	
1	1	0	1	1	0	1	0	91		1	1	0	1	1	1	1	0	123	
0	0	1	1	1	0	1	0	92		0	0	1	1	1	1	1	0	124	
1	0	1	1	1	0	1	0	93		1	0	1	1	1	1	1	0	125	
0	1	1	1	1	0	1	0	94		0	1	1	1	1	1	1	0	126	
1	1	1	1	1	0	1	0	95		1	1	1	1	1	1	1	0	127	

Address Codes 128-159									Address Codes 160-191								
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	0	1	128	0	0	0	0	0	1	0	1	160
1	0	0	0	0	0	0	1	129	1	0	0	0	0	1	0	1	161
0	1	0	0	0	0	0	1	130	0	1	0	0	0	1	0	1	162
1	1	0	0	0	0	0	1	131	1	1	0	0	0	1	0	1	163
0	0	1	0	0	0	0	1	132	0	0	1	0	0	1	0	1	164
1	0	1	0	0	0	0	1	133	1	0	1	0	0	1	0	1	165
0	1	1	0	0	0	0	1	134	0	1	1	0	0	1	0	1	166
1	1	1	0	0	0	0	1	135	1	1	1	0	0	1	0	1	167
0	0	0	1	0	0	0	1	136	0	0	0	1	0	1	0	1	168
1	0	0	1	0	0	0	1	137	1	0	0	1	0	1	0	1	169
0	1	0	1	0	0	0	1	138	0	1	0	1	0	1	0	1	170
1	1	0	1	0	0	0	1	139	1	1	0	1	0	1	0	1	171
0	0	1	1	0	0	0	1	140	0	0	1	1	0	1	0	1	172
1	0	1	1	0	0	0	1	141	1	0	1	1	0	1	0	1	173
0	1	1	1	0	0	0	1	142	0	1	1	1	0	1	0	1	174
1	1	1	1	0	0	0	1	143	1	1	1	1	0	1	0	1	175
0	0	0	0	1	0	0	1	144	0	0	0	0	1	1	0	1	176
1	0	0	0	1	0	0	1	145	1	0	0	0	1	1	0	1	177
0	1	0	0	1	0	0	1	146	0	1	0	0	1	1	0	1	178
1	1	0	0	1	0	0	1	147	1	1	0	0	1	1	0	1	179
0	0	1	0	1	0	0	1	148	0	0	1	0	1	1	0	1	180
1	0	1	0	1	0	0	1	149	1	0	1	0	1	1	0	1	181
0	1	1	0	1	0	0	1	150	0	1	1	0	1	1	0	1	182
1	1	1	0	1	0	0	1	151	1	1	1	0	1	1	0	1	183
0	0	0	1	1	0	0	1	152	0	0	0	1	1	1	0	1	184
1	0	0	1	1	0	0	1	153	1	0	0	1	1	1	0	1	185
0	1	0	1	1	0	0	1	154	0	1	0	1	1	1	0	1	186
1	1	0	1	1	0	0	1	155	1	1	0	1	1	1	0	1	187
0	0	1	1	1	0	0	1	156	0	0	1	1	1	1	0	1	188
1	0	1	1	1	0	0	1	157	1	0	1	1	1	1	0	1	189
0	1	1	1	1	0	0	1	158	0	1	1	1	1	1	0	1	190
1	1	1	1	1	0	0	1	159	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

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