



# FULL DC INVERTER SYSTEMS OPERATION MANUAL

GW-MOD

COMMERCIAL AIR CONDITIONERS SDV5



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# 1. Safety Precautions

The product, and its Operation and Installation Manual describes the following content, including how to handle the product, prevent harm to others and prevent property losses, as well as how to use the product correctly and safely. Read the following carefully and make sure you understand the content (identifiers and marks), and observe the below precautions.

## ⚠ Caution

Read the safety precautions carefully prior to installation.  
Make sure you observe the important safety precautions provided below.





Meanings of marks:

- ⚠ Caution: Improper handling may lead to personal injury or material loss.
- ⚠ Warning: Improper handling may lead to death or serious injury.

Once the installation work is completed, test to verify that the device is operating normally, and hand over the manual to the customer for safekeeping.

[Note] The "harm" means that the affected party does not need to be admitted to hospital or require long-term treatment. This generally refers to wounds, scalds, or electric shocks. Material losses refer to property and material losses.

Icons

Icon	Name	
	Prohibited. Specific information about the prohibited item is described within the icons or in the form of graphics or text next to where the symbol is located.	
	Mandatory. Specific information about the mandatory item is described within the icons or in the form of graphics or text next to where the symbol is located.	
 Warning	Commissioned installation	Get your distributor or a professional to install the product. The installation personnel must be equipped with the professional knowledge. When you install on your own, any mistake you made during the operations may lead to a fire, electric shock, or injury.
 Using Warning	Prohibited	Do not use combustible paints to spray directly on the data converter as this may cause a fire.
	Prohibited	Do not handle the product with wet hands, and do not let water seeps into the device, as this will cause electric shocks.

## ⚠ Warning

- Get your distributor or a professional to install the product.
- Non-professionals may not install the equipment properly which may in turn lead to electric shock or fire.

## ⚠ Caution

Do not install the product to where there is a danger of flammable gas leakages. Any leakage within the vicinity of the device may cause a fire.

## 2. Overview

### 2-1 Gateway Interface

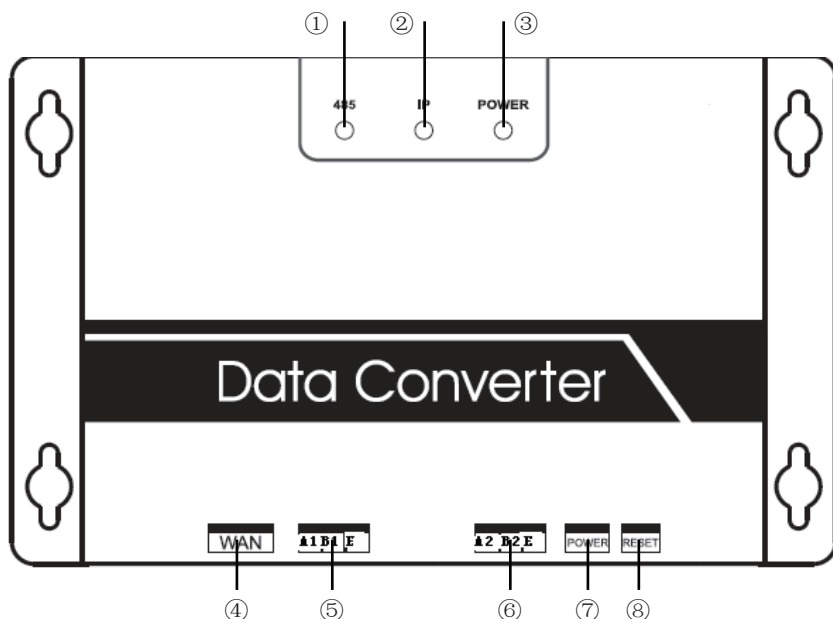


Figure 1

No.	Item	Description
①	485 indicator	Indicates if the 485 communication is normal.
②	IP indicator	Indicator for IP-based communications.
③	POWER indicator	Power indicator.
④	WAN port	Connecting to a switch through an RJ45 cable, to access the built-in Web page of the gateway, or use the Modbus/TCP protocol to access the gateway.
⑤	A1B1E port	485 port to connect to the VRF air conditioning system.
⑥	A2B2E port	485 port to connect to an upper computer system that supports the Modbus/RTU protocol.
⑦	POWER	DC 5V power interface.
⑧	RESET	RESET button.

## 2. Overview

### 2-2 System Architecture

The gateway only supports V6 outdoor air conditioning unit (for indoor units (IDUs), please consult Technical Support). The IDU/ODU addresses for the air conditioning unit cannot be reset once the unit is connected. Up to 64 indoor units and 4 outdoor units in the same refrigerant system can be connected. When there is a change in the network address of the ODU, and change in IDU address, you need to reboot the gateway.

The upper computer system accesses the gateway using two methods: one is based on the Modbus/RTU protocol through the 485 interface, as shown in ②; another is through the Modbus/TCP protocol, as shown in ①.

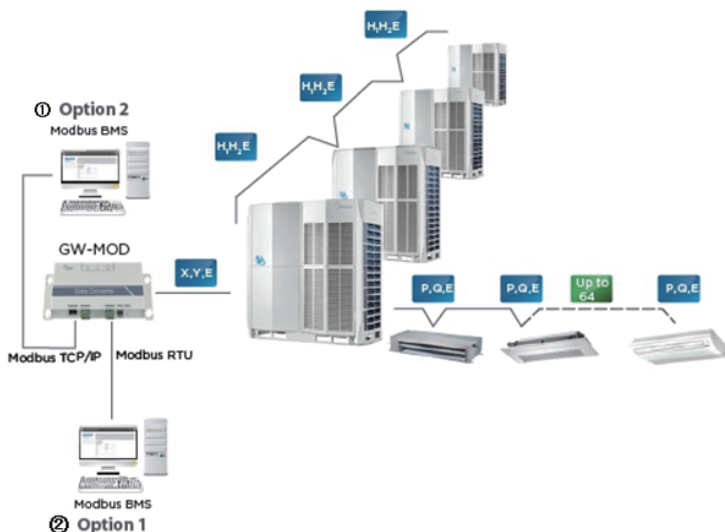


Figure 2 Modbus gateway system architecture diagram

\*Please check with Technical Support on the applicable outdoor and indoor unit models as well as the functions.

## 2. Overview

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### 2-3 Function Code for Commands

Function Code	Function Name	Function
0x02	Read Discrete Input	Read
0x03	Read Holding Register	Read
0x04	Read Input Register	Read
0x06	Write Single Register	Write
0x10	Write Holding Register	Write

### 2-4 Error Response

The master device sends a request and waits for a response from the slave device. The slave device will respond normally if there is no error. If there is a data verification error, the slave device will not respond. When there is an error (except for verification error) in the data sent by the master device, the slave device will respond with the error code.

Code	Name	Meaning
0x01	Invalid function code	Slave unit does not support the function code it has received.
0x02	Invalid data address	Slave unit does not support the data address it has received.
0x03	Invalid data	Slave unit does not support the data value it has received.
0x06	Slave unit is busy	The slave unit is busy working on a long command, and the master unit needs to send the message when the slave unit is idle.

## 3. Using the Product

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### 3-1 Default IP Address of Gateway

The default IP address of the gateway is 192.168.1.200. The IP address of the upper computer must be on the same network segment as the gateway, that is, 192.168.1.xx (xx: 2~254). After the upper computer has been configured with a static IP address, access the embedded web page to change the IP address of the gateway as required.

To configure the static IP address on the upper computer: Open the protocol property dialogue box to configure the IP address and subnet mask, such as 192.168.1.211 as the IP address and 255.255.255.0 as the subnet mask. Then, click "OK", as shown below:

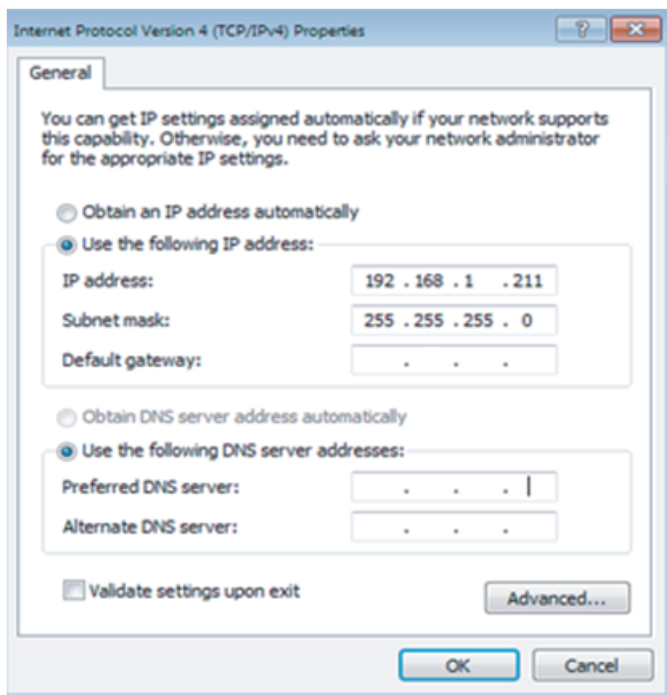


Figure 3



## 3. Using the Product

### 3-2 Gateway Settings

Open the browser, and enter "http://192.168.1.200" into the address bar to go to the Web page of the gateway. Select "Settings". The following page is displayed:

Welcome to Modbus Gateway System 中文/English

MODBUS GATEWAY

- Read Discrete Inputs
- Read Input Registers
- Configuration**

### Configure Settings

Modbus Address: 1

Modbus Commu. Setting: 9600 | Parity: None-无校验 | StopBit: 1

IP Address: 192.168.1.200

Netmask: 255.255.255.0

Gateway: 192.168.1.1

Get Setting successful

[Get Setting](#) [Apply Setting](#)

version 171220/V15

Figure 4

The parameters in the settings are as follows:

Parameter	Description
Modbus Address	Gateway device number that is used to distinguish multiple Modbus gateways in the same segment. Addresses cannot be repeated.
Modbus Communication Settings	Baud rate: Default is 9600; Parity bit: Default is no parity check; Stop bit: Default is bit 1.
IP Address	IP address of the current Modbus gateway. IP addresses of multiple Modbus gateways cannot be repeated.
Subnet Mask	Default: 255.255.255.0
Gateway	Gateway address of the local router

Once you have modified the corresponding parameter, click "Apply Setting". To view the updated settings, click "Get Setting". After the change to settings, the Modbus gateway will automatically restart, and the network will be disconnected, and then reconnected again.

## 3. Using the Product

### 3-3 View Air conditioner Information

Select "Discrete inputs" or "Input register" in the Web page to view the air conditioner information.

Select "Discrete inputs". In the displayed page as shown in the following figure, click the address code of the IDU or ODU. The operating information of the unit is displayed correspondingly. The red box shows the device that is currently selected.

When you choose discrete inputs, you will get the following page. For example, the address, "10369", represents the ON/OFF state of the IDU at address 46. ● in the figure indicates the device is ON. Refer to the Address Mapping Table for the VRF Modbus Gateway for specific details about the parameters.

Welcome to Modbus Gateway System 中文/English

MODBUS GATEWAY

- Read Discrete Inputs
- Read Input Registers
- Configuration

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

**Indoor#46:COOL-MODE**

Modbus-address	Data name	Value
10369	On/Off	●
10370	Error	○
10371	Online status	●
10372	--	○
10373	--	○
10374	--	○
10375	--	○
10376	--	○

Figure 5 Discrete inputs

In the functional column of the input register, select an IDU to view relevant information. Refer to the Address Mapping Table for the VRF Modbus Gateway for details on the parameters shown in the list. For example, column 1 in the table below shows the address, column 2 shows the parameter details, and column 3 is the parameter value, where an entry like 25/0019 means that 25 is decimal, and 0019 is hexadecimal.

## 3. Using the Product

Welcome to Modbus Gateway System 中文/English

MODBUS GATEWAY

- Read Discrete Inputs
- Read Input Registers**
- Configuration

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

**Indoor#46:COOL-MODE**

Modbus-address	Data name	Value
30737	Mode	2/0002
30738	Fan speed	12/000C
30739	Set temperature/cool temp_set	28/001C
30740	heat temp set	19/0013
30741	Room temperature	25/0019
30742	Error code	0/0000
30743	Mode-lock	0/0000
30744	Fan-lock	0/0000
30745	Remote controller lock	0/0000
30746	Wired controller lock	0/0000
30747	Cooling set temp lock	0/0000
30748	Heating set temp lock	0/0000
30749	Swing lock	0/0000
30750	--	0/0000
30751	--	0/0000
30752	--	0/0000

Figure 6 Input Register

Select Outlet#0, Outlet#1, Outlet#2, Outlet#3 at the lower right corner to go to the parameter display page of the IDU. #0, #1, #2, and #3 represent four ODUs (one master unit and three slave units) that belong to the same refrigerant system. When ODUs from many refrigerant systems are connected, only information about the ODU in the refrigerant system with the lowest address will be shown. You need to restart the gateway if the ODU address changes. For example, if the ODUs from refrigerant systems 2 and 6 are connected at the same time, then the gateway will read information about the ODU from refrigerant system 2.

Welcome to Modbus Gateway System 中文/English

MODBUS GATEWAY

- Read Discrete Inputs
- Read Input Registers**
- Configuration

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

**Outlet#0:Online**

Modbus-address	Data name	Value
32001	Mode	1/0001
32002	Outdoor temperature	-25/00E7
32003	City of indoor unit	0/0000
32004	Error code	0/0000
32005	--	0/0000
32006	--	0/0000
32007	--	0/0000
32008	--	0/0000
32009	--	0/0000
32010	--	0/0000

Figure 7 ODU information

## 3. Using the Product

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### 3-4 Upper Computer Access

The upper computer system can communicate with the gateway using either Modbus/TCP protocol or Modbus/RTU. Refer to Figure 2 and Figure 3 for information on the specific wiring.

### 3-5 Mapping Table Addressing

The register address in the mapping table uses a PLC address. The protocol address is used during the actual communication, and the relationships between the protocol address and the PLC address are as follows:

- 1) Discrete input register: Protocol address = Register address (PLC) - 10001
- 2) Input register: Protocol address = Register address (PLC) - 30001
- 3) Holding register: Protocol address = Register address (PLC) - 40001

### 3-6 Examples

A. Modbus/RTU data frame description:

Request/Response:

Device Address	Function Code	Data	Error Check and Correction
1 byte	1 byte	N bytes	2 bytes

#### 1) 0x02 Read Discrete Input

Suppose that the register address data in IDU0 is 10001~10003:

Start address = Register address - 10001

Actual address of 10001~10003 in IDU0 is 0~2.

Request message: 01 02 00 00 00 03 38 0B

Response message: 01 02 01 05 61 8B

### 3. Using the Product

Request Message		Response Message	
Domain Name	(hexadecimal)	Domain Name	(hexadecimal)
Device Address	01	Device Address	01
Function Code	02	Function Code	02
Higher byte of start address	00	Number of bytes	01
Lower byte of start address	00	Input status 7-0	05
Higher byte of number of discrete inputs	00	Higher byte of verification code	61
Lower byte of number of discrete inputs	03	Lower byte of verification code	8B
Higher byte of verification code	38		
Lower byte of verification code	0B		

05 is the byte in the response message that reflects the input status with the corresponding binary of 00000101, and the 0~2 address data is 101 respectively. Check the address mapping table which shows that the unit power status is 1, error status is 0, and online status is 1.

#### 2) 0x03 Read Holding Register

Suppose that the register address data in IDU0 is 40003~40005:

Start address = (Register address - 40000) - 1

Actual address of 40003~40005 in IDU0 is 2~4.

Request message: 01 03 00 02 00 03 A4 0B

Response message: 01 03 06 00 01 00 03 00 14 EC BA

## 3. Using the Product

Request Message		Response Message	
Domain Name	(hexadecimal)	Domain Name	(hexadecimal)
Device Address	01	Device Address	01
Function Code	03	Function Code	03
Higher byte of start address	00	Number of bytes	06
Lower byte of start address	02	Higher byte of holding register 1	00
Higher byte of number of input registers	00	Lower byte of holding register 1	01
Lower byte of number of input registers	03	Higher byte of holding register 2	00
Higher byte of verification code	A4	Lower byte of holding register 2	03
Lower byte of verification code	0B	Higher byte of holding register 3	00
		Lower byte of holding register 3	14
		Higher byte of verification code	EC
		Lower byte of verification code	BA

### 3) 0x04 Read Input Register

Suppose that the register address data in IDU0 is 30001~30008:

Start address = Register address - 30001

Actual address of 30001~30008 in IDU0 is 0~7.

Request message: 01 04 00 00 00 08 F1 CC

Response message: 01 04 10 00 02 00 0C 00 1A 00 00 00 EC 00 00 00 00 00 00 9E 37

## 3. Using the Product

Request Message		Response Message	
Domain Name	(hexadecimal)	Domain Name	(hexadecimal)
Device Address	01	Device Address	01
Function Code	04	Function Code	04
Higher byte of start address	00	Number of bytes	10
Lower byte of start address	00	Higher byte of input register 1	00
Higher byte of number of input registers	00	Lower byte of input register 1	02
Lower byte of number of input registers	08	Higher byte of input register 2	00
Higher byte of verification code	F1	Lower byte of input register 2	0C
Lower byte of verification code	CC	Higher byte of input register 3	00
		Lower byte of input register 3	1A
		Higher byte of input register 4	00
		Lower byte of input register 4	00
		Higher byte of input register 5	00
		Lower byte of input register 5	EC
		Higher byte of input register 6	00
		Lower byte of input register 6	00
		Higher byte of input register 7	00
		Lower byte of input register 7	00
		Higher byte of input register 8	00
		Lower byte of input register 8	00
		Higher byte of verification code	9E
		Lower byte of verification code	37

## 3. Using the Product

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### 4) 0x06 Write Single Register

For example, if the register address for all the devices in group control is 40001, and the parameter value of group control is set to 2.

Start address = Register address - 40001

The initial address of 40001 for the group control is 0.

Request message: 01 06 00 00 00 02 08 0B

Response message: 01 06 00 00 00 02 08 0B

Request Message		Response Message	
Domain Name	(hexadecimal)	Domain Name	(hexadecimal)
Device Address	01	Device Address	01
Function Code	06	Function Code	06
Higher byte of register address	00	Higher byte of output address	00
Lower byte of register address	00	Lower byte of output address	00
Higher byte of register value	00	Higher byte of output value	00
Lower byte of register value	02	Lower byte of output value	02
Higher byte of verification code	08	Higher byte of verification code	08
Lower byte of verification code	0B	Lower byte of verification code	0B



## 3. Using the Product

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### 5) 0x10 Write Holding Register

For example, controls for the mode, fan speed and temperature setting in IDU0 are cool, fan speed 3, and 20°C respectively, and the corresponding register addresses are 40003~40005.

Start address = Register address - 40001

Actual start address of 40003~40005 is 2~4.

Request message: 01 10 00 02 00 03 06 00 02 00 03 00 14 CE 85

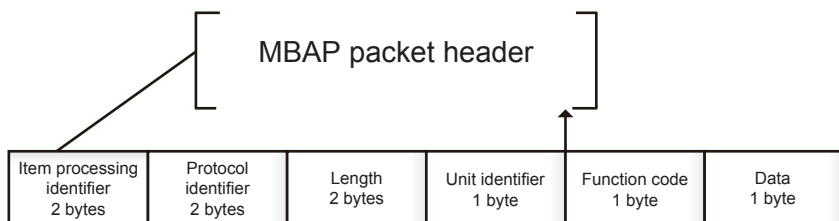
Response message: 01 10 00 02 00 03 21 C8

Request Message		Response Message	
Domain Name	(hexadecimal)	Domain Name	(hexadecimal)
Device Address	01	Device Address	01
Function Code	10	Function Code	10
Higher byte of start address	00	Higher byte of start address	00
Lower byte of start address	02	Lower byte of start address	02
Higher byte of register number	00	Higher byte of register number	00
Lower byte of register number	03	Lower byte of register number	03
Number of bytes	06	Higher byte of verification code	21
Higher byte of register value	00	Lower byte of verification code	C8
Lower byte of register value	02		
Higher byte of register value	00		
Lower byte of register value	03		
Higher byte of register value	00		
Lower byte of register value	14		
Higher byte of verification code	CE		
Lower byte of verification code	85		

## 3. Using the Product

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B. Modbus/TCP data frame description:



### 1) 0x02 Read Discrete Input

Suppose that the register address data in IDU0 is 10001~10003:

Request Message: C9 ED 00 00 00 06 01 02 00 00 03

Request Message: C9 ED 00 00 00 04 01 02 01 05

### 2) 0x03 Read Holding Register

Suppose that the register address data in IDU0 is 40003~40005:

Request Message: CA A9 00 00 00 06 01 03 00 02 00 03

Request Message: CA A9 00 00 00 09 01 03 06 00 02 00 03 00 14

### 3) 0x04 Read Input Register

For example, reading the register address data in IDU0 as 30001~30008:

Request Message: CB 0E 00 00 00 06 01 04 00 00 00 08

Request Message: CB 0E 00 00 00 13 01 04 10 00 02 00 0C 00 1A 00 00 00  
EC 00 00 00 00 00

### 4) 0x06 Write Single Register

For example, if the register address for all the devices in group control is 40001, and the parameter value of group control is set to 2:

Request Message: CC 47 00 00 00 06 01 06 00 00 00 02

Response Message: CC 47 00 00 00 06 01 06 00 00 00 02

### 5) 0x10 Write Holding Register

For example, controls for the mode, fan speed and temperature setting in IDU0 are cool, fan speed 3, and 20°C respectively, and the corresponding register addresses are 40003~40005:

Request Message: CB EC 00 00 00 0D 01 10 00 02 00 03 06 00 02 00 03 00  
14

Response Message: CB EC 00 00 00 06 01 10 00 02 00 03

## 4. Restore Factory Settings

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Press and hold the Reset key on the gateway, and then power on the gateway and release the button after 2 seconds to restore the system to factory settings.

# NOTE CONCERNING PROTECTION OF ENVIRONMENT

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This product must not be disposed of via normal household waste after its service life, but must be taken to a collection station for the recycling of electrical and electronic devices. The symbol on the product, the operating instructions or the packaging indicate such disposal procedures. The materials are recyclable in accordance with their respective symbols. By means of re-use, material recycling or any other form of recycling old appliances you are making an important contribution to the protection of our environment. Please ask your local council where your nearest disposal station is located.

## PRODUCER

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This product was manufactured in China (Made in China).

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