

Networking Solutions of A/C System

Software function code: X1.LY516A.TY.B03M V100A09

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I . Overview

1.1 Application Scope

Available for all the Pomp split-type computer control system networking monitoring

1.2 References

- A. ModbusApplicationProtocol_v1_1.pdf
- B. VFD-B Instruction Manual
- C. LG Operation Instruction of LG Frequency Converter
- D. BAS Communication Protocol

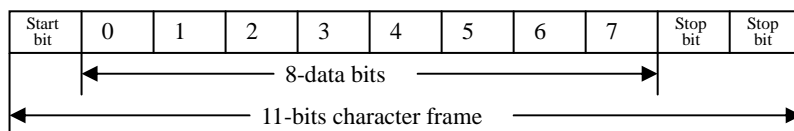
II . Abbreviation Definition

III. Description of MODBUS Protocol

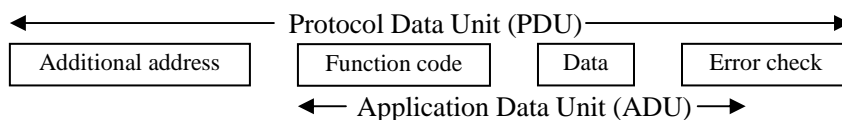
3.1 General

- A. Use RTU type of MODBUS Protocol
- B. Adopt RS-485 multipoint bus type principal and subordinate mode and asynchronous half-duplex mode with 8 digit data and no parity bit, and Baud rate of 9600bps. (8, N, 2 for RTU)

3.2 Character Topology (8, N, 2)



3.3 MODBUS Data Frame



3.4 Three Kinds of Data Frame Defined in MODBUS Protocol

MODBUS Request PDU: fuction_code-[1 byte] + request_data-[n bytes]

MODBUS Response PDU: fuction_code-[1 byte] + response_data-[n bytes]

MODBUS Exception PDU: fuction_code||0x80-[1 byte] + exception_code [1 byte]

3.5 MODBUS Data Fame Length Restriction

Max. Length of PDU = 256 bytes.

3.6 MODBUS Data Coding

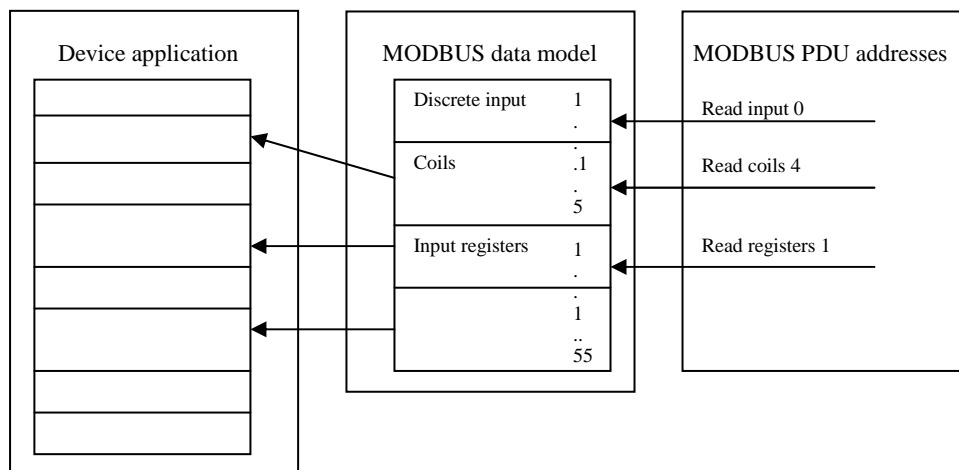
For example, if sending data 0x1234, please firstly send 0x12 and then 0x34.

3.7 MODBUS Data Model

Primary Tables	Object Type	Type of Access	Comments
Discretes input	Single bit	Read-Only	This type of data can be provided by an I/O system.
Coils	Single bit	Read-Write	This type of data can be alterable by an application program.
Input registers	16-bit word	Read-Only	This type of data can be provided by an I/O system.
Holding registers	16-bit word	Read-Write	This type of data can be alterable by an application program.

3.8 MODBUS Address Model

Data address: From 0 to 65535



3.9 MODBUS Function Code

Public function codes

User-Defined function codes

Reserved function codes

127	Public function codes
110	User-Defined function codes
100	Public function codes
72	User-Defined function codes
65	Public function codes
1	Public function codes

Definition of public function codes:

				Function Codes		
				code	Sub code	(hex)
Data access	Bit access	Physical Discrete Inputs	Read Discrete Inputs	02		02
		Internal Bits Or Physical coils	Read Coils	01		01
			Write Single Coil	05		05
			Write Multiple Coils	15		0F
	16 bits access	Physical Input registers	Read Input Register	04		04
		Internal Registers Or Physical Output Registers	Read Holding Registers	03		03
			Write Single Register	06		06
			Write Multiple Registers	16		10
			Read/Write Multiple Registers	23		17
			Mask Write Registers	22		16
			Read FIFO Queue	24		18
	File record access	Read File record	20	6	14	
		Write File record	21	6	15	
	Diagnostics			Read Exception status	07	
Diagnostic				08	00-18	
Get Com event counter				11		0B
Get Com event Log				12		0C
Report Slave ID				17		11
Read device Identification				43	14	2B
Other			Encapsulated Interface Transport	43		2B

3.10 Description of Public Function Codes

(Key description on the following function codes: 01, 02, 03, 04, 05, 06, 15, 16, 23)

- A. 01 (0x01) Read Coils. For example, when reading 01H, the address outputs the signal in 19 switches starting from 0x0013.

Request			Response		
Address	01H		Address	01H	
Function	01H		Function	01H	
Starting address Hi	00H	0x0000~	Byte count	03H	
Starting address Lo	13H	0xFFFF	Output status 27-20	CDH	
Number Hi	00H	0x0001~	Output status 35-28	6BH	
Number Lo	13H	0x07D0	Output status 38-36	05H	
CRC CHK Low	8CH		CRC CHK Low	42H	
CRC CHK High	02H		CRC CHK High	82H	

Byte count = Number/8 or Number/8+1(if remainder > 0)

- B. 02 (0x02) Read Discrete Input. For example, when reading 01H, the address inputs the signal in 21 switches starting from 0x00C4.

Request			Response		
Address	01H		Address	01H	
Function	02H		Function	02H	
Starting address Hi	00H	0x0000~ 0xFFFF	Byte count	03H	
Starting address Lo	C4H		Input status 204-197	ACH	
Number Hi	00H	0x0001~ 0x07D0	Input status 212-205	DBH	
Number Lo	16H		Input status 218-213	35H	
CRC CHK Low	B8H		CRC CHK Low	22H	
CRC CHK High	39H		CRC CHK High	88H	

Byte count = Number/8 or Number/8+1(if remainder > 0)

- C. 03(0x03) Read Holding Registers. For example: when reading 01H, the address refers to the current value of three integer variables starting from 0x006B.

Request			Response		
Address	01H		Address	01H	
Function	03H		Function	03H	
Starting address Hi	00H	0x0000~ 0xFFFF	Byte count	06H	
Starting address Lo	6BH		Register Hi (108)	02H	
Number Hi	00H	1~ 0x7D	Register Lo (108)	2BH	
Number Lo	03H		Register Hi (109)	00H	
CRC CHK Low	74H		Register Lo (109)	00H	
CRC CHK High	17H		Register Hi (110)	00H	
			Register Lo (110)	64H	
			CRC CHK Low	05 H	
			CRC CHK High	7AH	

Byte count = Number * 2.

- D. 04(0x04) Read Input Registers For example: When reading 01H, the address refers to the current value of an integer variable starting from 0x0008.

Request			Response		
Address	01H		Address	01H	
Function	04H		Function	04H	
Starting address Hi	00H	0x0000~ 0xFFFF	Byte count	02H	
Starting address Lo	08H		Input Reg. Hi (9)	00H	
Number Hi	00H	1~ 0x7D	Input Reg. Lo (9)	0AH	
Number Lo	01H		CRC CHK Low	39H	
CRC CHK Low	B0H		CRC CHK High	37H	
CRC CHK High	08H				

Byte count = Number * 2.

- E. 05(0x05) Write Single Coil. For example: when reading 01H, the address refers to output single of a switch in the 0x00AC.

Request			Response		
Address	01H		Address	01H	

Function	05H		Function	05H	
Output address Hi	00H	0x0000~	Output address Hi	00H	0x0000~
Output address Lo	ACH	0xFFFF	Output address Lo	ACH	0xFFFF
Output value Hi	FFH	0x0000 or	Output value Hi	FFH	0x0000 or
Output value Lo	00H	0xFF00	Output value Lo	00H	0xFF00
CRC CHK Low	4CH		CRC CHK Low	4CH	
CRC CHK High	1BH		CRC CHK High	1BH	

When value is 0x0000, it indicates OFF; 0xFF00 indicates ON.

- F. 06(0x06) Write Single Register. For example: when writing 01H, the address refers to an integer variable of 0x0001.

Request			Response		
Address	01H		Address	01H	
Function	06H		Function	06H	
Reg. address Hi	00H	0x0000~	Reg. address Hi	00H	0x0000~
Reg. address Lo	01H	0xFFFF	Reg. address Lo	01H	0xFFFF
Reg. value Hi	00H	0x0000~	Reg. value Hi	00H	0x0000~
Reg. value Lo	03H	0xFFFF	Reg. value Lo	03H	0xFFFF
CRC CHK Low	98H		CRC CHK Low	98H	
CRC CHK High	0BH		CRC CHK High	0BH	

- G. 07(0x07) Read Exception Status (Serial Line Only). For example:

Request			Response		
Address	01H		Address	01H	
Function	07H		Function	07H	
CRC CHK Low	41H		Output data	6DH	0x00~0xFF
CRC CHK High	E2H		CRC CHK Low	E3H	
			CRC CHK High	DDH	

When output data is 6D (0110 1101B), 0 indicates OFF .1 indicates ON.

- H. 08(0x08) Diagnostics (Serial Line Only). Communication Loop Test. For example:

Request			Response		
Address	01H		Address	01H	
Function	08H		Function	08H	
Sub-function Hi	00H		Sub-function Hi	00H	
Sub-function Lo	00H		Sub-function Lo	00H	
CRC CHK High	A5H		CRC CHK High	A5H	
CRC CHK High	37H		CRC CHK High	37H	

Detailed instructions were omitted.

- I. 11 (0x0B) Get Comm Event Counter (Serial Line Only), omitted.
 J. 12 (0x0C) Get Comm Event Log (Serial Line Only), omitted.
 K. 15 (0x0F) Write Multiple Coils. For example: when writing 01H, the address outputs the signal in 10 switches starting from 0x0013.

Request			Response		
Address	01H		Address	01H	

Function	0FH		Function	0FH	
Starting address Hi	00H	0x0000~	Starting address Hi	00H	0x0000~
Starting address Lo	13H	0xFFFF	Starting address Lo	13H	0xFFFF
Number Hi	00H	0x0001~	Number Hi	00H	0x0001~
Number Lo	0AH	0x07B0	Number Lo	0AH	0x07B0
Byte Count	02H		CRC CHK Low	24H	
Output value Hi	CDH		CRC CHK High	09H	
Output value Lo	01H				
CRC CHK Low	72H				
CRC CHK High	CBH				

Byte count = Number/8 or Number/8+1 (if remainder > 0)

- L. 16(0x10) Write Multiple Registers. For example: when writing 01H, the address refers to two integer variables of 0x0001.

Request			Response		
Address	01H		Address	01H	
Function	10H		Function	10H	
Starting address Hi	00H	0x0000~	Starting address Hi	00H	0x0000~
Starting address Lo	01H	0xFFFF	Starting address Lo	01H	0Xffff
Number Hi	00H	0x0001~	Number Hi	00H	0x0001~
Number Lo	02H	0x007B	Number Lo	02H	0x007B
Byte Count	04H		CRC CHK Low	10H	
Reg. value Hi	00H		CRC CHK High	08H	
Reg. value Lo	0AH				
Reg. value Hi	01H				
Reg. value Lo	02H				
CRC CHK Low	92H				
CRC CHK High	30H				

Byte count = Number * 2.

- M. 17(0x11) Report Slave ID (Serial Line Only), omitted.
 N. 20 / 6 (0x14 / 0x06) Read File Record, omitted.
 O. 21 / 6 (0x15 / 0x06) Write File Record, omitted.
 P. 22 (0x16) Mask Write Register, omitted.
 Q. 23(0x17) Read/Write Multiple Registers. For example: for 01H, read address from two integer variables of 0x0001; write address from three integer variables of 0x000E.

Request			Response		
Address	01H		Address	01H	
Function	17H		Function	17H	
rStarting address Hi	00H	0x0000~	Byte Count	0CH	
rStarting address Lo	03H	0xFFFF	rReg. value Hi	00H	
rNumber Hi	00H	0x0001~	rReg. value Lo	FEH	
rNumber Lo	06H	0x0076	rReg. value Hi	0AH	
wStarting address Hi	00H		rReg. value Lo	CDH	
wStarting address Lo	0EH		rReg. value Hi	00H	

wNumber Hi	00H	0x0001~ 0x0076	rReg. value Lo	01H	
wNumber Lo	03H		rReg. value Hi	00H	
wByte Count	06H		rReg. value Lo	03H	
Reg. value Hi	00H		rReg. value Hi	00H	
Reg. value Lo	FFH		rReg. value Lo	0DH	
Reg. value Hi	00H		rReg. value Hi	00H	
Reg. value Lo	FFH		rReg. value Lo	FFH	
Reg. value Hi	00H		CRC CHK Low	1DH	
Reg. value Lo	FFH		CRC CHK High	79H	
CRC CHK Low	46H				
CRC CHK High	91H				

Byte count = rNumber * 2.

- R. 24 (0x18) Read FIFO Queue, omitted.
- S. 43 (0x2B) Encapsulated Interface Transport, omitted.
- T. 43 / 14 (0x2B / 0x0E) Read Device Identification, omitted.

3.11 Additional Response during Communication Failure

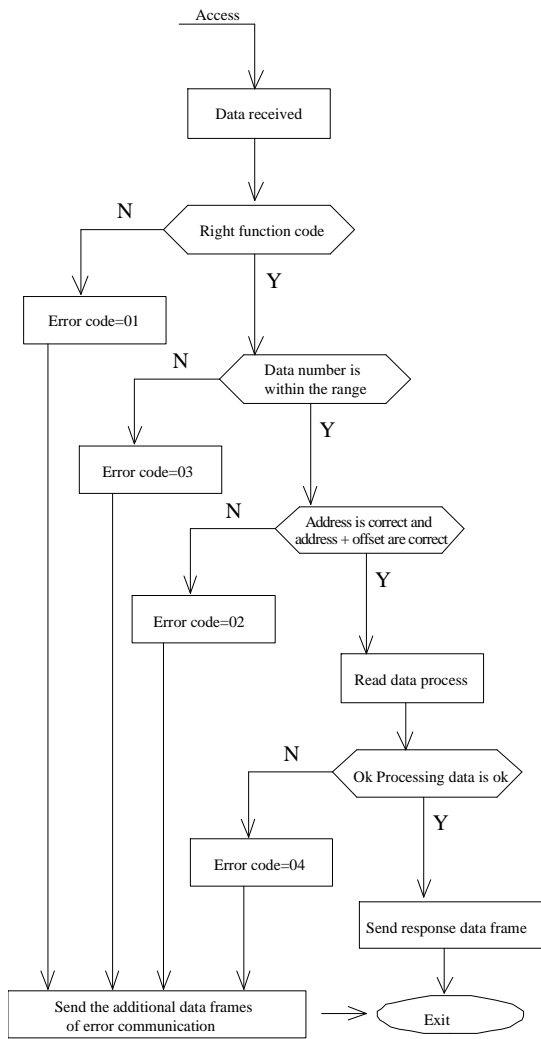
A. In case of errors in data communication, the slave needs to respond to error code data frame and set the top digit of function code to be 1 (namely, Function Code + 0x80), and then send it to the host so that the host can know there are errors. For example:

Request			Response		
Address	01H		Address	01H	
Function	01H		Function	81H	
Starting address Hi	00H	0x0000~	Exception code	02H	
Starting address Lo	13H	0xFFFF	CRC CHK Low	C1H	
Number Hi	00H	0x0001~	CRC CHK High	91H	
Number Lo	13H	0x07D0			
CRC CHK Low	8CH				
CRC CHK High	02H				

B. Definition of Exception Code:

Code	Name	Meaning
01	Illegal Function	Function code failure
02	Illegal Data Address	Address failure
03	Illegal Data Value	Failure value, out of range and unrecognized
04	Slave Device False	The slave can't handle it
05	Acknowledge	
06	Slave Device Busy	
08	Memory Parity Error	
0A	Gateway Path Unavailable	
0B	Gateway Target Device Failed to Respond	

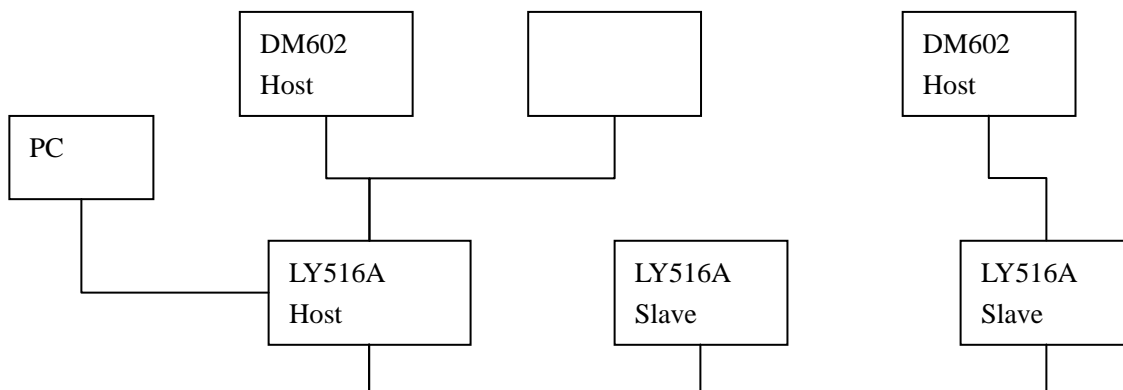
C. Coding Flow Chart:



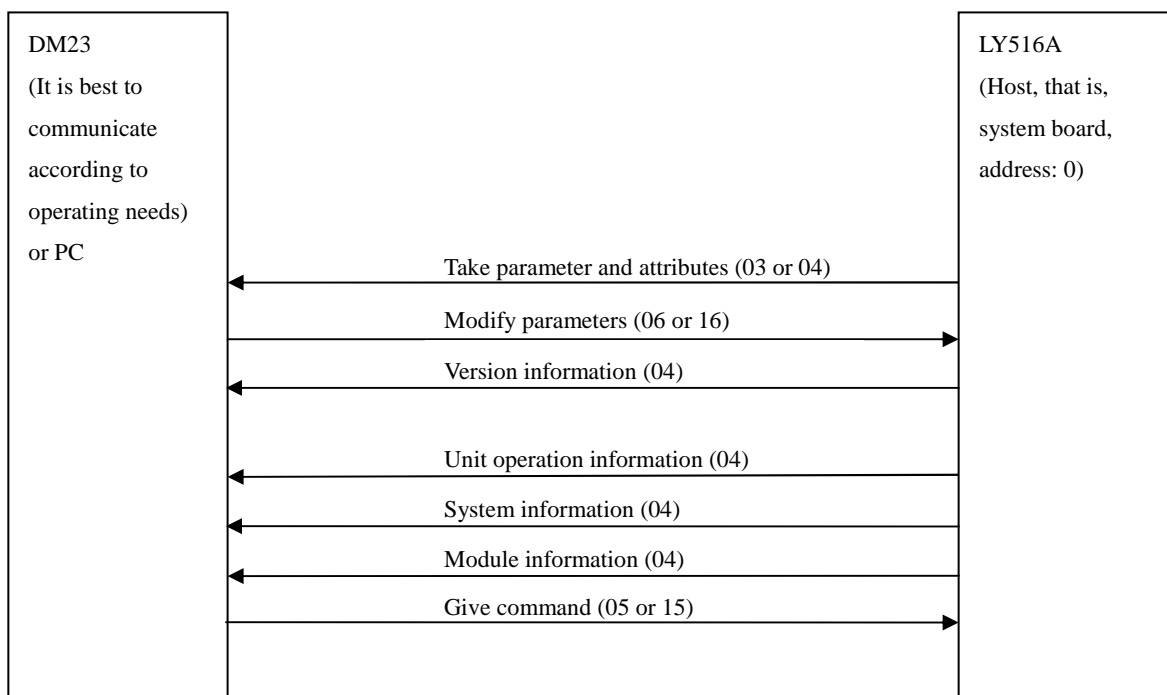
IV. System Application

Adopt ModBus RTU Protocol

4.1 Network Topology Map



4.2 Network Communication Data



4.3 Definition of Communication Protocol

Communication Content	Address Space		Function Code (16 system) Operation		Operation Authorization of Serial Port			
	Base Address	Size	Writing	Reading	1	2	3	4
User operation command	0x0000	128	05 or 15		•	•		

Version information	0x0100	32 × 16		04	•	•		
Unit information	0x0500	16		04	•	•		
	0x0600	10		04	•	•		
Module command/information	0x0700	128 × N		04	•	•		
	0x0200	512 × N		02	•	•		
System information	0x1700	128		04	•	•		
	0x0000	512		02	•	•		
Parameter group information	0x1800	1 + P		04	•	⊙		
Parameter item information	0x1900	128 × P		04	•	⊙		
Parameter value	0x2300	32 × P	06 or 16	03	•	⊙		

Where:

1. N refers to module number, 32 modules at most. The information about each module occupies 50 addresses.
2. P refers to parameter group, 20 groups at most. Each group of parameters includes 32 digits at most actually and each parameter has 4 attribute values.
3. ⊙ indicates that user parameters can only be operated (namely, parameters in group 1 and group 2).

4.4 [Read-write switching value] User Operation Command

Base address: 0x0000 and 32 command numbers at most.					
Relative Address	Data Name	Remarks (0: invalid, 1: valid command)			
0x00...0x0F	Common command	B0	Startup command	B8	Reset command
		B1	Shutdown command	B9	Silence command
		B2		B10	Cancel preheat command
		B3		B11	
		B4		B12	
		B5		B13	
		B6		B14	
		B7		B15	
0x10...0x1F	Module forced defrosting command	B0	Module 0# forced defrosting	B8	Module 8# forced defrosting
		B1	Module 1# forced defrosting	B9	Module 9# forced defrosting
		B2	Module 2# forced defrosting	B10	Module 10# forced defrosting
		B3	Module 3# forced defrosting	B11	Module 11# forced defrosting
		B4	Module 4# forced defrosting	B12	Module 12# forced defrosting
		B5	Module 5# forced defrosting	B13	Module 13# forced defrosting

			defrosting		
		B6	Module 6# forced defrosting	B14	Module 14# forced defrosting
		B7	Module 7# forced defrosting	B15	Module 15# forced defrosting

4.5 [Only read integer quantity] Version Information

Base address: 0x0100, and each module has an independent version number and occupies 32 bytes.		
Relative Address	Data Name	Remarks
0x00	Module 0# version number	Version number is indicated by ACSII characters
0x10	Module 1# version number	
...		

4.6 [Only read integer quantity] Public Area Information

Information in the first paragraph: System information							
Base address: 0x500							
Relative Address	Data Name	Remarks					
0x00	Unit state	(0: invalid, 1: valid)					
		B0	Unit standby state	B8	Unit preheating		
		B1	Starting unit	B9	Unit failure		
		B2	Unit operation	B10	Unit anti-freezing		
		B3	Unit during shutdown	B11	Standby		
		B4	Serious alarm state of unit	B12	Standby		
		B5	Standby	B13	Standby		
		B6	Standby	B14	Standby		
0x01	Module number	-32700 indicates that the item doesn't exist					
0x02	Module press number						
0x03	Machine type					0: water supply; 1: wind supply	
0x04	Setting mode					Please refer to "Mode Setting" in the parameter list	
0x05	Present mode of operation						
0x06	Setting temperature of A/C						
0x07	Setting temperature of hot water						
0x08	Control						

	temperature of A/C				
0x09	Control temperature of hot water				
0x0A	Whether heat recovery is used	0: Not used; 1: used			
0x0B	Use setting of module	0: Not used; 1: used Bit0~~bit15 respond to #0~~#15 modules			
0x0C...0xFF	Standby				
Information in the second paragraph: Secondary attribute					
Base address: 0x600					
Relative Address	Data Name	Remarks			
0x00	Available mode of system	(0: Unavailable; 1: Available)			
		B0	Cooling	B8	Standby
		B1	Heating	B9	Standby
		B2	Hot water	B10	Standby
		B3	Cooling+ some hot water	B11	Standby
		B4	Cooling+ hot water	B12	Standby
		B5	Heating+ hot water	B13	Standby
		B6	Automatic	B14	Standby
B7	Standby	B15	Standby		
0x01	Available state of press output	Correspond to locations of output points and please refer to 4.9 [Only Read Integer Quantity] Information About No. N (0~15) Module (0: Not used; 1: used)			
0x02	Available state of module output				
0x03	Available state of system output 1				
0x04	Available state of system output 2				
0x05	Available state of press input	Correspond to locations of input points and please refer to 4.9 [Only Read Integer Quantity] Information About No. N (0 ~ 15) Module (0: Not used; 1: used)			
0x06	Available state of module input				
0x07	Available state of module input 1				
0x08	Available state of module input 2				

4.7 [Only read integer quantity] System Board Information

Base address: 0x1700, maximum data size: 256 (0x0100)

Relative address	Data name	Remarks																																
0x00...0x09	Standby																																	
	(5 in total)																																	
0x0A	Output	(0: off, 1: output)																																
		<table border="1"> <tr> <td>B0</td> <td>A/C pump</td> <td>B8</td> <td>Hot water pump</td> </tr> <tr> <td>B1</td> <td>Electrical heating of A/C</td> <td>B9</td> <td></td> </tr> <tr> <td>B2</td> <td></td> <td>B10</td> <td></td> </tr> <tr> <td>B3</td> <td></td> <td>B11</td> <td></td> </tr> <tr> <td>B4</td> <td>Pressure fan</td> <td>B12</td> <td></td> </tr> <tr> <td>B5</td> <td></td> <td>B13</td> <td></td> </tr> <tr> <td>B6</td> <td></td> <td>B14</td> <td></td> </tr> <tr> <td>B7</td> <td></td> <td>B15</td> <td>Failure indicator</td> </tr> </table>	B0	A/C pump	B8	Hot water pump	B1	Electrical heating of A/C	B9		B2		B10		B3		B11		B4	Pressure fan	B12		B5		B13		B6		B14		B7		B15	Failure indicator
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0x11...0x13	DSR																																	
	(10 in total)																																	
0x14...0x1D	Standby																																	
	(5 in total)																																	
0x1E...0x22	Standby																																	
	(16 in total)																																	
0x23	Failure 1	(1: Failure; 0: Failure-free.)																																
		<table border="1"> <tr> <td>B0</td> <td></td> <td>B8</td> <td>Overload of A/C water pump</td> </tr> <tr> <td>B1</td> <td>Power failure</td> <td>B9</td> <td>Insufficient water flow of A/C</td> </tr> </table>	B0		B8	Overload of A/C water pump	B1	Power failure	B9	Insufficient water flow of A/C																								
B0		B8	Overload of A/C water pump																															
B1	Power failure	B9	Insufficient water flow of A/C																															

		B2	EEPROM data error	B10	Overload of hot water pump
		B3	External interlocking	B11	Insufficient hot water flow
		B4		B12	
		B5		B13	
		B6		B14	Overload of pressure fan
		B7		B15	Air supply pressure difference
0x24	Failure 2	B0		B8	
		B1		B9	
		B2		B10	
		B3		B11	
		B4		B12	
		B5		B13	
		B6		B14	
		B7		B15	
0x25	Failure 3	B0		B8	Too high output temperature at the side of A/C in the system
		B1	Failure in the detector of ambient temperature	B9	Too low output temperature at the side the A/C in the system
		B2	Failure in output temperature (evaporation) of the system	B10	
		B3	Failure in temperature recovery (evaporation) of the system	B11	
		B4		B12	
		B5		B13	
		B6		B14	
		B7		B15	
0x26...0x32	Standby failure				
	(48 in total)	Analog quantity			
0x33	Ambient temperature	Unit: 0.1 °C, in addition, -32702 means open circuit, -32703 means short circuit			
0x34	Hot water temperature of evaporation	Ditto			
0x35	Return water temperature of	Ditto			

	evaporation	
0x36	Temperature of hot water tank	Ditto
0x36...0x63	Standby	

4.8 [Only read integer quantity] Information about No. N (0 ~ 15) Module

Base address: 0x700, the maximum data size of each module: 128 (0x0800).			
Namely, base address of 1# module is 0x0780, base address of 2# module is 0x0800, and the rest can be done in the same manner.			
Relative Address	Data Name	Remarks	
0x00...0x09	Standby		
	(5 in total)		
0x0A	Press 1# output	(0: off, 1: output)	
		B0	Press
		B8	
		B1	Four-way valve S1
		B9	
		B2	
		B10	
		B3	
		B11	
		B4	
		B12	
		B5	
		B13	
		B6	
		B14	
		B7	
		B15	
0x0B	Press 2# output	Ditto	
0x0C	Press 3# output	Ditto	
0x0D	Press 4# output	Ditto	
0x0E	Unit output	(0: invalid input, 1: valid input)	
		B0	Fan 1 low speed
		B8	
		B1	Fan 2 low speed
		B9	
		B2	Fan 3 low speed
		B10	
		B3	Fan 4 low speed
		B11	
		B4	
		B12	
		B5	
		B13	
		B6	
		B14	
		B7	
		B15	
	(5 in total)		
0x0F	Press 1# input	(0: invalid input, 1: valid input)	
		B0	Press low voltage
		B8	
		B1	Press high voltage
		B9	
		B2	
		B10	
		B3	
		B11	
		B4	
		B12	
		B5	
		B13	

		B6		B14	
		B7		B15	
0x10	Press 2#input	Ditto			
0x11	Press 3# input	Ditto			
0x12	Press 4# input	Ditto			
0x13	Unit input	B0		B8	Fan 1 overload
		B1	Unit water current shortage	B9	
		B2		B10	Fan 3 overload
		B3		B11	
		B4		B12	Unit air supply pressure difference
		B5		B13	
		B6		B14	
		B7		B15	
	(16 in total)				
0x23	Communication failure	B0	Communication failure	B8	
		B1		B9	
		B2		B10	
		B3		B11	
		B4		B12	
		B5		B13	
		B6		B14	
		B7		B15	
0x24...0x25	Standby				
0x26	Press 1# failure	B0	Press low voltage	B8	
		B1	Press high voltage	B9	
		B2		B10	Too high temperature of fin
		B3		B11	
		B4		B12	
		B5		B13	
		B6		B14	
		B7	Failure in temperature of fin	B15	
0x27		Standby			
0x28	Press 2# failure	Ditto			
0x29					
0x2A	Press 3# failure	Ditto			
0x2B					
0x2C	Press 4# failure	Ditto			
0x2D					
0x2E	Unit failure	B0		B8	

		B1	Phase dislocation and loss	B9	Fan 1 overload
		B2	EEPROM data error	B10	
		B3		B11	Fan 3 overload
		B4		B12	
		B5		B13	Unit air supply pressure difference
		B6	Unit frozen water current shortage	B14	
		B7		B15	
0x2F		B0	Evaporating temperature detector 1# failure	B8	Too low output temperature at the side of A/C 1#
		B1	Evaporating temperature detector 2# failure	B9	Too low output temperature at the side of A/C 2#
		B2	Evaporating temperature detector 3# failure	B10	Too low output temperature at the side of A/C 3#
		B3	Evaporating temperature detector 4# failure	B11	Too low output temperature at the side of A/C 4#
		B4	Too high output temperature at the side of A/C 1#	B12	
		B5	Too high output temperature at the side of A/C 2#	B13	
		B6	Too high output temperature at the side of A/C 3#	B14	
		B7	Too high output temperature at the side of A/C 4#	B15	
Analog quantity of press 1#					
0x33	Standby				
0x34	Standby				
0x35	Standby				
0x36	Standby				
0x37	Standby				
0x38	Temperature 1 of fin n#		Ditto		
0x39	Standby				
0x3A	Standby				

Analog quantity of presses 2#, 3# and 4#, ditto		
Unit analog quantity	(16 in total)	
0x53	Unit evaporating temperature	Unit: 0.1°C, in addition, -32702 means open circuit, -32703 means short circuit
0x54~0x5E	Standby	
0x5F	Anti-icing temperature	Ditto
0x60	Unit evaporating temperature recovery	Ditto

4.9 [Only read integer quantity] Parameter Attribute

Base address: 0x1800.		
Relative address	Data name	Remarks
0x00	reserved	
0x01	Parameter information of group 1	Low bytes refer to number of parameter and high bytes refer to parameter attribute
0x02	Parameter information of group 2	Low bytes refer to number of parameter and high bytes refer to parameter attribute

Base address: 0x1900. The maximum data size of each group of parameters: 0x80 digits, but each parameter has four attributes, so the maximum number of each group of parameter is 32. Namely, base address of parameters in group 1 is 0x1980, and base address of parameters in group 2 is 0x1A00.				
Relative Address	Data Name	Remarks		
	Parameter of group 1			
0x000...0x003	1st parameter of this group	W0	Min. parameter value	
		W1	Parameter default value	
		W2	Max. parameter value	
		W3	Parameter attribute	
0x004...0x007	2nd parameter of this group	Ditto		
.....				
	Parameter of group 2			
0x100...0x103	1st parameter of this group	Ditto		
0x104...0x107	2nd parameter of this group	Ditto		
.....				

16 meanings of parameter attribute			
B0	Number of decimal points	B8	Bit manipulation
B1	1: One decimal point; 2: Two decimal points; 3: Three decimal points.	B9	Difference in temperature
B2	Standby	B10	
B3		B11	Unchangeable (available for check)
B4	Unit:	B12	
B5	0: No; 1: temperature; 2: current (A); 3: pressure	B13	
B6	(bar)	B14	
B7	4: percentage (%); 5: frequency (HZ); 6: rotate speed (rps); 7: rotate speed (rpm); 8: second (s); 9: minute; 10: hour; 11: day	B15	

4.10 [Read and write integer quantity] Group N Parameter

Base address: 0x2300, value of each parameter

Relative Address	Data Name	Min	Initial Value	Max	Unit	Remarks
	Parameter of group 1 (user parameter)					
0x000	Set control mode	1	1	3		1. Heating; 2. Cooling; 3. Automatic
0x001	Set cooling temperature	Refrigeration lower limit	7	Refrigeration upper limit	°C	
0x002	Set heating temperature	Heating lower limit	45	Heating upper limit	°C	
	Parameter of group 2 (user parameter)					
0x20	Use of module	0	1	0xFFFF	byte	1. Use 0. Forbidden
0x21	Number of modules	1	1	16		