MODBUS RS485 Communication protocol

1、The communication adopts RS485 bus, with asynchronous serial signals having 1 start bit, 8 data bits, 1 end bit, no parity check, and a baud rate of 9600bps.

2、Compliant with standard MODBUS RTU protocol, 16 bit data structure, 16 bit CRC check low byte before high byte after.

4、The upper computer is the calling host, and the controller is the slave machine。

5、The master-slave communication uses three commands：

Command 03H (query 1 or more registers)

Send command: [Device address]+[Command number 03H]+[Start register address high 8 bits]+[Low 8 bits]+[Read register number high 8 bits]+[Low 8 bits]+[CRC check low 8 bits]+[CRC check high 8 bits]

Device response: [Device address]+[Command number 03H]+[Number of bytes returned]+[Data 1]+[Data 2]++ [Data n]+[Low 8 bits of CRC check]+[High 8 bits of CRC check]

Command 06H (Modify Single Register)

Send command: [Device address]+[Command number 06H]+[Register address to be set high 8 bits]+[Low 8 bits]+[Data to be set high 8 bits]+[Low 8 bits]+[CRC check low 8 bits]+[CRC check high 8 bits]

Device response: If the command sent by the computer is successfully returned intact, otherwise it will not respond

Command 10H (Modify Multiple Registers)

Send command: [Device address]+[Command number 10H]+[Start register address high 8 bits]+[Low 8 bits]+[Register number high 8 bits]+[Low 8 bits]+[Register byte number]+[Data 1 high 8 bits]+[Low 8 bits]++ [Data N high 8 bits]+[low 8 bits]+[CRC check low 8 bits]+[CRC check high 8 bits]

Device response: [Device address]+[Command number 10H]+[Start register address high 8 bits]+[Low 8 bits]+[Register number high 8 bits]+[Low 8 bits]+[CRC check low 8 bits]+[CRC check high 8 bits]

Parameter address (R indicates that the parameter is read-only, RW indicates that the parameter is readable and writable)

data address	Description	set range	Remarks
R 0x0000	Reserve		
R 0x0001	Reserve		
R 0x0002	Switch		
R 0x0003	Work status flag		
R 0x0004	Output flag 1		
R 0x0005	Output Flag 2		
R 0x0006	Output flag 3		
R 0x0007	Fault flag 1		
R 0x0008	Fault flag 2		
R 0x0009	Fault flag 3		
R 0x000A	Fault flag 4		
R 0x000B	Fault flag 5		
R 0x000C	Fault flag 6		
R 0x000D	Fault flag 7		
R 0x000E	reserve		
R 0x000F	Inlet water temperature	-30~99℃	
R 0x0010	Outlet water temperature	-30~99℃	
R 0x0011	Ambient temperature	-30~99℃	
R 0x0012	Coil 1 temperature	-30~99℃	
R 0x0013	Return gas 1 temperature	-30~99℃	
R 0x0014	Cooling coil 1 temperature	-30~99℃	
R 0x0015	Exhaust 1 temperature	0~125℃	
R 0x0016	Reserve		
R 0x0017	Reserve		
R 0x0018	Main expansion valve opening1		

R 0x0019	Auxiliary expansion valve opening1		
R 0x001A	Compressor 1 target frequency		
R 0x001B	Actual frequency of compressor 1		
R 0x001C	Frequency module 1 fault 1		
R 0x001D	Frequency module 1 fault 2		
R 0x001E	DC bus voltage value1		
R 0x001F	Heat sink temperature1		
R 0x0020	Compressor phase current1		
R 0x0021	Reserve		
R 0x0022	Reserve		
R 0x0023	Reserve		
R 0x0024	DC fan 1 speed		
R 0x0025	DC fan 2 speed (reserved)		
R 0x0026	Coil 2 temperature (reserved)	-30~99℃	
R 0x0027	Return gas 2 temperature (reserved)	-30~99℃	
R 0x0028	Refrigeration coil 2 temperature (reserved)	-30~99℃	
R 0x0029	Exhaust 2 temperature (reserved)	0~125℃	
R 0x002A	Reserve		
R 0x002B	Reserve		
R 0x002C	Main expansion valve opening 2 (reserved)		
R 0x002D	Auxiliary expansion valve opening 2 (reserved)		
R 0x002E	Target frequency of compressor 2 (reserved)		

R 0x002F	Actual frequency of compressor 2 (reserved)		
R 0x0030	Frequency module 2 fault 1 (reserved)		
R 0x0031	frequency module 2 fault 2 (reserved)(reserved)		
R 0x0032	DC bus voltage value 2 (reserved)		
R 0x0033	Heat sink temperature 2 (reserved)		
R 0x0034	Compressor phase current 2 (reserved)		
R 0x0035	Reserve		
R 0x0036	Reserve		
R 0x0037	Reserve		
R 0x0038	Reserve		
R 0x0039	Reserve		
R 0x003A	Total current of the unit		
R 0x003B	Reserve		
R 0x003C	Reserve		
R 0x003D	Reserve		
R 0x003E	Reserve		
RW 0x003F	Parameter Flag Definition		
RW 0x0040	Mode		
RW 0x0041	Heating sett temperature	8℃~40℃	
RW 0x0042	Cooling set temperature	8℃~28℃	
RW 0x0043	Manual frequency setting		
RW 0x0044	Manual steps of expansion valve	20~450	
RW 0x0045	Manual steps of auxiliary valve		
RW 0x0046	Manual frequency setting 2		

	(reserved)		
RW 0x0047	Manual steps for expansion valve 2 (reserved)		
RW 0x0048	Auxiliary valve 2 manual steps (reserved)		
RW 0x0049	Manual wind speed		
RW 0x004A	Reserve		
RW 0x004B	Reserve		
RW 0x004C	Reserve		

Control switch port

bit 0 : Reserve
bit 1 : Water flow switch
bit 2 : Low pressure switch
bit 3 :High pressure switch
bit 4 : Reserve
bit 5 : Reserve
bit 6 : Reserve
bit 7 : Emergency switch

Work status flag

bit 0 : Hot water available
bit 1 : High temperature
bit 2 : Heating
bit 3 : Cooling
bit 4 : Reserve
bit 5 : High water level
bit 6 : Low water level
bit 7 : Defrost

Output Flag

bit 0 : Compressor1
bit 1 : Compressor2（Reserve）
bit 2 : Reserve
bit 3 : Reserve
bit 4 : Reserve
bit 5 : Fan motor
bit 6 : Four-way valve
bit 7 : AC high and low wind 0=low wind/1=high wind

Output Flag 2

bit 0 : Reserve
bit 1 : Reserve
bit 2 : Reserve
bit 3 : Makeup valve
bit 4 : Reserve
bit 5 : Reserve
bit 6 : Air conditioning cooling demand
bit 7 : Air conditioning heating demand

Output flag 3

bit 0 : Reserve
bit 1 : Electric heating of crankshaft
bit 2 : Circulating water pump
bit 3 : Reserve
bit 4 : Reserve
bit 5 : Reserve
bit 6 : Reserve
bit 7 : Reserve

Fault flag 1

bit 0 : Reserve
bit 1 : Environmental temperature fault
bit 2 : Coil 1 temperature fault
bit 3 : Reserve
bit 4 : Water outlet temperature fault
bit 5 : High pressure Fault
bit 6 : Low pressure fault
bit 7 : Reserve

Fault Flag 2

bit 0 : Water flow switch failure
bit 1 : Reserve
bit 2 : Protection against excessive temperature of heating water outlet
bit 3 : Reserve
bit 4 : Reserve
bit 5 : Coil 2 temperature fault (reserved)
bit 6 : High pressure switch 2 fault (reserved)
bit 7 : Low voltage switch 2 fault (reserved)

Fault flag 3

bit 0 : Reserve
bit 1 : Reserve
bit 2 : Reserve
bit 3 : Reserve
bit 4 : Reserve
bit 5 : DC fan 2 fault (reserved)
bit 6 : Exhaust 1 temperature fault
bit 7 : Reserve

Fault flag 4

bit 0 : Inlet water temperature fault
bit 1 : Exhaust 1 temperature too high fault
bit 2 : Reserve
bit 3 : Reserve
bit 4 : Reserve
bit 5 : Cooling water outlet temperature supercooling protection
bit 6 : Suction air 1 temperature fault
bit 7 : Reserve

Fault flag 5

bit 0 : Reserve
bit 1 : Reserve
bit 2 : Coil 1 over temperature protection
bit 3 : Cooling coil 1 temperature fault
bit 4 : Reserve
bit 5 : Coil 2 over temperature protection (reserved)
bit 6 : Exhaust 2 temperature too high fault (reserved)
bit 7 : Reserve

Fault flag 6

bit 0 : Reserve
bit 1 : Reserve
bit 2 : Reserve
bit 3 : Reserve
bit 4 : Secondary antifreeze
bit 5 : First level antifreeze
bit 6 : Reserve
bit 7 : Reserve

Fault flag 7

bit 0 : Temperature fault of refrigeration coil 2 (reserved)
bit 1 : Reserve
bit 2 : Communication failure of frequency conversion module 2 (reserved)

bit 3 : Return gas 2 temperature fault (reserved)
bit 4 : Communication failure of variable frequency module 1
bit 5 : Exhaust 2 temperature fault (reserved)
bit 6 : DC fan 1 fault
bit 7 : Reserve

Parameter Flag Definition 1

bit 0 : Wire controlled switch
bit 1 : Manual frequency
bit 2 : Expansion valve mode selection 0 manual/1 automatic
bit 3 : Reserve
bit 4 : Water pump working mode 0=non-stop/1=periodic operation
bit 5 : Refrigeration expansion valve working mode 0=environment/1=superheat
bit 6 : Mute mode 0=no mute/1=with mute
bit 7 : Reserve
bit 8 : Strong mode 0=no strong/1=strong (when silent mode is present, silent mode takes priority)
bit 11 : Commodity inspection mode 0=Press operates normally/1=Press starts quickly
bit 13 : Fan mode
bit 14 : Forced defrosting
bit 15 : Parameter reset 0 not reset/1 Parameter reset

Mode

bit 0 : Mode selection 1 heating/2 cooling/7 automatic
bit 1 : Reserve
bit 2 : Reserve
bit 3 : Reserve
bit 4 : Strong mode **0 no strong mode /1 strong mode（reserve）**
bit 5 : Reserve
bit 6 : Reserve
bit 7 : Reserve