

## 15. MODBUS RTU PROTOCOL

### MODBUS RTU Communication Protocol

From: To:  
Version V1.1 update: 2021/11/08

#### 1. Transmission Format

Baud Rate	9600bps
Start bit	1
Byte width	8
Parity	N
Stop bits	1
Slave address	H10

#### 2. Packet Format

Address	Function	Data	CRC checksum
16bits	16bits 03: Function of reading multi registers 16: Function of presenting multi registers	N*16bits	16bits

#### 3. Data types

Data Types	Description
TEMP	Signed byte, 0.1 °C resolution, formula: T*10, the temperature range is -30~97 °C (when 25 °C is displayed, the data transmitted by the protocol is 250 according to the above formula; When the display is -25 °C, the data transmitted by the protocol is -250; when bit15 is 1, it represents a negative number, and when bit15 is 0, it represents an integer;), when this value is 32767, it indicates that the corresponding sensor is faulty.
DIGI1	Unsigned byte, unit 1, data transmitted is 123 when 123 is displayed.
DIGI2	Unsigned byte, unit 10, data transmitted is 123 when 1230 is displayed.
DIGI3	Unsigned byte, unit 100, data transmitted is 123 when 12300 is displayed.
DIGI4	Unsigned byte, unit 100, data transmitted is 123 when 12300 is displayed.
DIGI5	Unsigned byte, unit 0.1, data transmitted is 123 when 12.3 is displayed.
DIGI6	Unsigned byte, unit 0.001, data transmitted is 123 when 0.123 is displayed.
DIGI9	Unsigned byte, unit 0.01, data transmitted is 12 when 0.12 is displayed.

#### 4.Mailing address

Address	Function	Number	Content	mode	Default	Description	Remark
1011	03/06		Power on/off	read/write		0-OFF/1-ON	DIGI1
1012	03/06		Mode	read/write		H05=1: 0-Hot water/1-Heating/2-Cooling/3-Hot water + heating/4-Hot water + Cooling H05=0: 0-Hot water/1-Heating/3-Hot water + heating	DIGI1
1045	03/06		Forced switching time for heating water	read/write	120	1~180min	DIGI1
1157	03/06	H32	Domestic hot water target temperature	read/write	55	R36-R37	TEMP1
1158	03/06	R01	Heating target temperature	read/write	45	R10~R11	TEMP1
1159	03/06	R02	Cooling target temperature	read/write	7	R08~R09	TEMP1
1160	03/06	R03	Heating start-up return difference	read/write	2	0~10°C	TEMP1
1161	03/06	R04	Heating constant temperature shutdown temperature difference	read/write	1	0~10°C	TEMP1
1173	03/06	R05	Use of electric heating	read/write	0	0-No electric heating/1-water circuit electric heating/2-water tank electric heating	DIGI1
1174	03/06	R35	Cooling start-up return difference	read/write	2	0.0~10.0°C	TEMP1
1175	03/06	R06	Cooling constant temperature shutdown temperature difference	read/write	1	0.0~10.0°C	TEMP1
1193	03/06	R07	Operating ambient temperature of main circulating pump	read/write	2	-10~20°C	TEMP1
1194	03/06	R40	Operating ambient temperature of air conditioning pump	read/write	2	-10~20°C	TEMP1
1195	03/06	R41	Hot water start-up return difference	read/write	5	0~10°C	TEMP1
1196	03/06	R16	Hot water constant temperature shutdown temperature difference	read/write	2	0~10°C	TEMP1
1197	03/06	R17	Operating mode of circulating water pump	read/write	2	0-normal/1-special/2-intermittent	TEMP1
1198	03/06	P01	Circulating water pump operation time interval	read/write	30	1~120min	DIGI1

1199	03/06	P02	Circulating water pump operation duration	read/write	3	1~30min	DIGI1
1201	03/06	P03	Operating mode of domestic hot water pump	read/write	2	0-normal/1-special/2-intermittent	DIGI1
1202	03/06	P05	Manually controlled water pump	read/write	0	0-off/1-on	DIGI1
2011	16		Power On/Off state	Write		0-power off/1-power on	DIGI1
2012	16		Operation mode	write		0-Cooling/1-heating/2-defrosting/3-high temperature disinfection/4 hot water	DIGI1
2013	16		Current temperature value (after limit)	write			DIGI1
1238	03/16	R62	Max water outlet temperature of heat pump	Read/write	62	45-95°C	TEMP1
2014	16		Current temperature value (after compensation, for heating mode only)	write			TEMP1
2019	16	O01~023		write		bit0: O01 System 1 compressor output (0-OFF/1-ON) bit1: Reserved bit2: O03 Fan high speed output (0-OFF/1-ON) bit3: O04 Fan low speed output (0-OFF/1-ON) bit4: O05 Main circulating water pump output (0-OFF/1-ON) bit5: O06 Domestic hot water pump output (0-OFF/1-ON) bit6: O07 Four-way valve 1 (0-OFF/1-ON) bit7: O08 Electric heating energy level one (0-OFF/1-ON) bit8: O09 Electric heating energy level two (0-OFF/1-ON) bit9: O10 Hot water 3-way valve (0-OFF/1-ON) bit10: O11 Alarm output (0-OFF/1-ON) bit11: O12 crankshaft heating tape (0-OFF/1-ON) bit12: O13 chassis heating tape (0-OFF/1-ON) bit13: O21 heating pump (0-OFF/1-ON) bit14: O22 hydraulic module water circuit electric heating (0-OFF/1-open) bit15: O23 hydraulic module water tank	DIGI1

						electric heating (0-OFF/1-ON)	
2034	16	S01~S10		write		bit0: S01 system 1 high voltage switch (0-ON/1-OFF) bit1: S02 system 1 low voltage switch (0-ON/1-OFF) bit2: S03 water flow switch (0-ON/1-OFF) bit3: S04 electric heating overload switch (0-ON/1-OFF) bit4: S05 emergency input (0-ON/1-OFF) bit5: S06 air conditioning mode switch (0-ON/1-OFF) bit6: S07 hot water mode switch (0-ON/1-OFF) bit7: Reserved bit8: Reserved bit9: S10 A/C switch (0°C-ON/1°C-OFF) bit10: Reserved bit11: Reserved bit12: Reserved bit13: Reserved bit14: Reserved bit15: Reserved	DIGI1
2045	16	T01	Water inlet temperature	write		Measured value	TEMP1
2046	16	T02	Water outlet temperature	write		Measured value	TEMP1
2047	16	T08	Water tank temperature	write		Measured value	TEMP1
2048	16	T04	Ambient temperature	write		Measured value	TEMP1
2072	16	T31	Compressor operating frequency	write		Measured value	DIGI1
2074	16	T27	DC fan 1 speed	write		Measured value	DIGI1
2075	16	T28	DC fan 2 speed	write		Measured value	DIGI1

2081	16			write	bit0: IPM over current failure bit1: Compressor drive failure bit2: Compressor over current bit3: Input voltage phase loss bit4: IPM current sampling failure bit5: Drive board device over temperature protection bit6: Pre-charge failure bit7: DC bus over voltage bit8: DC bus under voltage bit9: AC input under voltage bit10: AC input over current shutdown bit11: Input voltage sampling failure bit12: Communication failure between DSP and PFC bit13: Drive board temperature sensing failure bit14: Communication failure between DSP and communication board bit15: Communication failure with main control board	DIG11
2082	16			write	bit0: IPM module overheat shutdown bit1: Compressor phase loss bit2: Reserved bit3: Input current sampling failure bit4: Reserved bit5: Reserved bit6: EEPROM failure bit7: AC input over voltage protection bit8: Reserved bit9: Reserved bit10: Reserved bit11: Reserved bit12: Reserved bit13: Reserved bit14: Reserved	DIG11

						bit15: Compressor over speed protection	
2083	16			write		bit0: Compressor current frequency reduction alarm bit1: Compressor weak magnetic protection alarm bit2: Power unit overheat alarm bit3: Reserved bit4: AC input current frequency reduction alarm bit5: EEPROM fault alarm bit6: Reserved bit7: Burnt E2 disable start failure bit8: Reserved bit9: Reserved bit10: Reserved bit11: Reserved bit12: Reserved bit13: Reserved bit14: Reserved bit15: Reserved	DIG11
2085	16			write		bit0: Reserved bit1: Reserved bit2: Heating return water temperature sensing failure (0-no/1-yes) bit3: Heating outlet water temperature sensing failure (0-no/1-yes) bit4: High voltage protection of system 1 (0-no/1-yes) bit5: Reserved bit6: Low voltage protection of system 1 (0-no/1-yes) bit7: Reserved bit8: Water flow switch protection (0-no/1-yes) bit9: Electric heating overload protection (0-no/1-yes) bit10: Primary I anti-freezing protection in winter (0-no/1-yes)	DIG11

						bit11: Secondary anti-freezing protection in winter (0-no/1-yes) bit12: Anti-freezing protection of system 1 (0-no/1-yes) bit13: Reserved bit14: room temperature sensing failure (0-no/1-yes) bit15: Reserved	
2086	16			write		bit0: System 1 exhaust over-temperature protection (0-no/1-yes) bit1: Reserved bit2: Reserved bit3: Fan 1 overload speed limit (0-no/1-yes) bit4: Fan 2 overload speed limit (0-no/1-yes) bit5: Protection for excessive water temperature difference between inlet and outlet (0-no/1-yes) bit6: Protection against excessive outlet water temperature (0-no/1-yes) bit7: Water mixer outlet water temperature sensing failure (0-no/1-yes) bit8: Hot water return water temperature sensing failure (0-no/1-yes) bit9: Hot water outlet temperature sensing failure (0-no/1-yes) bit10: Reserved bit11: Reserved bit12: Reserved bit13: Reserved bit14: Reserved bit15: Reserved	DIG11

2087	16			write	bit0: Reserved bit1: Reserved bit2: Reserved bit3: Reserved bit4: System 1 high-voltage protection for 3 times or more (0-no/1-yes) bit5: Reserved bit6: System 1 low-voltage protection for 3 times or more (0-no/1-yes) bit7: Reserved bit8: Water flow switch protection for 3 times or more (0-no/1-yes) bit9: Electric heating overheating protection for 3 times or more (0-no/1-yes) bit10: Reserved bit11: Reserved bit12: System 1 anti-freezing protection for 3 times or more (0-no/1-yes) bit13: Reserved bit14: Reserved bit15: Reserved	DIG11
2088	16			write	bit0: System 1 exhaust over-temperature protection for 3 times or more (0-no/1-yes) bit1: Reserved bit2: Excessive inlet and outlet water temperature difference failure 3 times or more (0-no/1-yes) bit3: Outlet water temperature too low protection for 3 times or more (0-no/1-yes) bit4: Outlet water temperature too high protection for 3 times or more (0-no/1-yes) bit5: Reserved bit6: Reserved	DIG11

						bit7: Reserved bit8: Reserved bit9: Reserved bit10: Reserved bit11: Reserved bit12: Reserved bit13: Reserved bit14: Reserved bit15: Reserved	
2089	16			write		bit0: Inlet water temperature sensing failure (0-no/1-yes) bit1: Outgoing water temperature sensing failure (0-no/1-yes) bit2: System 1 coil temperature sensing failure (0-no/1-yes) bit3: Ambient temperature sensing failure (0-no/1-yes) bit4: System 1 return air temperature sensing failure (0-no/1-yes) bit5: System 1 anti-freezing 1 temperature sensing failure (0-no/1-yes) bit6: Outlet coil temperature sensing temperature failure (0-no/1-yes) bit7: Reserved bit8: Reserved bit9: System 1 EVI inlet temperature failure (0-no/1-yes) bit10: System1 EVI outlet temperature failure (0-no/1-yes) bit11: System1 exhaust temperature failure (0-no/1-yes) bit12: Reserved	DIG11

						bit13: System 1 pressure sensor failure (0-no/1-yes) bit14: Low ambient temperature protection (0-no/1-yes) bit15: Outlet water too low temperature protection (0-no/1-yes)	
2090	16			write		- bit0: Reserved bit1: Reserved bit2: Reserved bit3: Reserved bit4: Reserved bit5: Reserved bit6: Reserved bit7: Reserved bit8: Water tank temperature sensing failure (0-no/1-yes) bit9: Reserved bit10: Reserved bit11: Fan 1 failure (0-no/1-yes) bit12: Fan 2 failure (0-no/1-yes) bit13: Communication failure (E081 main board and DC fan)(0-no/1-yes) bit14: Communication failure with hydraulic module bit15: Communication failure (E082 main board and DC fan 2)(0-no/1-yes)	DIG11

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