

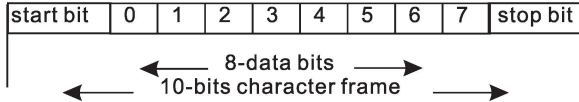
Modbus protocol

CSP-D184-01P

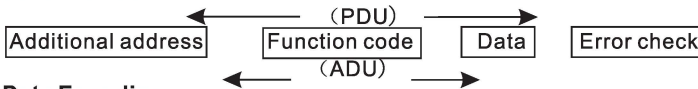
1. Overview

- A. Use RTU type of ModBus protocol
- B. Use R485 multi point bus master-slave structure, asynchronous half duplex mode, The data length of 8 bits no parity, baud rate is 9600bps. (8, N, 1 for RTU)

2. Character structure (8, N, 1)



3. MODBUS Data Frames



4. MODBUS Data Encoding

For example: send data 0x1234, first send 0x12, then 0x34.

5. MODBUS Address

5.1 【Read only register】System information (Operation function code: 0x04)

VRF system information					
Base address: 0x0000					
Operation address = Base address + Relative address					
Relative add.	Data name	Note			
0x00	The quantity of online indoor unit.	0~100 valid			
0x01	indoor unit online status 0	B0	#0 indoor unit	B8	#8 indoor unit
		B1	#1 indoor unit	B9	#9 indoor unit
		B2	#2 indoor unit	B10	#10 indoor unit
		B3	#3 indoor unit	B11	#11 indoor unit
		B4	#4 indoor unit	B12	#12 indoor unit
		B5	#5 indoor unit	B13	#13 indoor unit
		B6	#6 indoor unit	B14	#14 indoor unit
		B7	#7 indoor unit	B15	#15 indoor unit
		1-online; 0-offline			
0x02	indoor unit online status 1	B0	#16 indoor unit	B8	#24 indoor unit
		B1	#17 indoor unit	B9	#25 indoor unit
		B2	#18 indoor unit	B10	#26 indoor unit
		B3	#19 indoor unit	B11	#27 indoor unit
		B4	#20 indoor unit	B12	#28 indoor unit
		B5	#21 indoor unit	B13	#29 indoor unit
		B6	#22 indoor unit	B14	#30 indoor unit
		B7	#23 indoor unit	B15	#31 indoor unit
		1-online; 0-offline			

0x03	indoor unit online status 2	B0	#32 indoor unit	B8	#40 indoor unit
		B1	#33 indoor unit	B9	#41 indoor unit
		B2	#34 indoor unit	B10	#42 indoor unit
		B3	#35 indoor unit	B11	#43 indoor unit
		B4	#36 indoor unit	B12	#44 indoor unit
		B5	#37 indoor unit	B13	#45 indoor unit
		B6	#38 indoor unit	B14	#46 indoor unit
		B7	#39 indoor unit	B15	#47 indoor unit
		1-online; 0-offline			
0x04	indoor unit online status 3	B0	#48 indoor unit	B8	#56 indoor unit
		B1	#49 indoor unit	B9	#57 indoor unit
		B2	#50 indoor unit	B10	#58 indoor unit
		B3	#51 indoor unit	B11	#59 indoor unit
		B4	#52 indoor unit	B12	#60 indoor unit
		B6	#54 indoor unit	B14	#62 indoor unit
		B7	#55 indoor unit	B15	#63 indoor unit
		1-online; 0-offline			
0x05	indoor unit online status 4	B0	#64 indoor unit	B8	#72 indoor unit
		B1	#65 indoor unit	B9	#73 indoor unit
		B2	#66 indoor unit	B10	#74 indoor unit
		B3	#67 indoor unit	B11	#75 indoor unit
		B4	#68 indoor unit	B12	#76 indoor unit
		B5	#69 indoor unit	B13	#77 indoor unit
		B6	#70 indoor unit	B14	#78 indoor unit
		B7	#71 indoor unit	B15	#79 indoor unit
		1-online; 0-offline			
0x06	indoor unit online status 5	B0	#80 indoor unit	B8	#88 indoor unit
		B1	#81 indoor unit	B9	#89 indoor unit
		B2	#82 indoor unit	B10	#90 indoor unit
		B3	#83 indoor unit	B11	#91 indoor unit
		B4	#84 indoor unit	B12	#92 indoor unit
		B5	#85 indoor unit	B13	#93 indoor unit
		B6	#86 indoor unit	B14	#94 indoor unit
		B7	#87 indoor unit	B15	#95 indoor unit
		1-online; 0-offline			
0x07	indoor unit online status 6	B0	#96 indoor unit	B8	Reserved
		B1	#97 indoor unit	B9	Reserved
		B2	#98 indoor unit	B10	Reserved
		B3	#99 indoor unit	B11	Reserved
		B4	Reserved	B12	Reserved
		B5	Reserved	B13	Reserved
0x08—0xFF (Reserved)					

5.2. 【Read only register】N (0~99) indoor unit information (Operation function code: 0x04)

Input register (R)

Indoor unit information:						
Base add.: 0x0100, max. quantity of each indoor unit data: 32						
Operation address = Base address + Relative address						
Relative add.	Data name	Note				
#00indoor unit						
0x00	Indoor unit type info. 1					
0x01	Indoor unit type info. 2					
0x02	Running mode setting	B0	Ventilation mode 1: ON; 0: OFF	B8	Reserved	
		B1	Dehumidification 1: ON; 0: OFF	B9	Reserved	
		B2	Heating mode 1: ON; 0: OFF	B10	Reserved	
		B3	Cooling mode 1: ON; 0: OFF	B11	Reserved	
		B4	AUTO mode 1: ON; 0: OFF	B12	Reserved	
		B5	Reserved	B13	Reserved	
		B6	Reserved	B14	Reserved	
		B7	ON/OFF status 1: ON; 0: OFF	B15	Reserved	
		bit6~bit0 mutual exclusion each other				
0x03	Fan speed setting	B0	High fan speed 1: ON; 0: OFF	B8	Reserved	
		B1	Middle fan speed 1: ON; 0: OFF	B9	Reserved	
		B2	Low fan speed 1: ON; 0: OFF	B10	Reserved	
		B3	Reserve	B11	Reserved	
		B4	Reserved	B12	Reserved	
		B5	Reserved	B13	Reserved	
		B6	Reserved	B14	Reserved	
		B7	Auto fan speed 1: ON; 0: OFF	B15	Reserved	
		All bits are 0, that stands for fan motor is OFF				
0x04	Setting temperature	16~32stands for 16~32℃, other value is invalid.				
0x05	Room temperature T1	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)				
0x06	Evaporator temp. T2A	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)				
0x07	Temperature of middle evaporator T2B	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)				
0x08	Timer ON	0~96 Time On Hours = Data/4				
0x09	Timer OFF	0~96 Time Off Hours = Data/4)				
0x0A	Accessibility functions	B0	ECO running 1: ON; 0: OFF	B8	Reserved	
		B1	Auxiliary electric heater 1: ON; 0: OFF	B9	Reserved	
		B2	outward swing 1: ON; 0:OFF	B10	Reserved	

0x0B	Fault	B0	E0 phase sequence error	B8	E8 fan motor error
		B1	E1 communication error	B9	E9 communication error between IDU and wired controller
		B2	E2 T1 temp. sensor error	B10	EA over-current of compressor protection (4 times)
		B3	E3 T2A temp. sensor error	B11	EB inverter module protection
		B4	E4 T2B temp. sensor error	B12	EC Reserved
		B5	E5 outdoor unit error	B13	ED outdoor unit error
		B6	E6 zero-cross detection error	B14	EE water level detection error
		B7	E7 EEPROM error	B15	EF other error
0x0C	Protection	B0	P0 evaporator temperature protection	B8	P8 compressor over-current protection
		B1	P1 Defrost or anti-cold-wind protection	B9	P9
		B2	P2 condenser high temperature protection	B10	PA
		B3	P3 compressor temperature protection	B11	PB
		B4	P4 discharge temperature protection	B12	PC
		B5	P5 high pressure protection	B13	PD
		B6	P6 low pressure protection	B14	PE
		B7	P7 power supply over/under voltage protection	B15	PF other protections
0x0D	Power consumption	Unit 0.1 p			
0x0E	Indoor unit capacity demand	Actual capacity demand x10			
0x0F—0x1F (Reserved)					
#01 indoor unit					
0x20	Indoor unit type info. 1				
0x21	Indoor unit type info. 2				
0x22	Running mode setting				
0x23	Fan speed setting				
0x24	Setting temperature				
0x25	Room temperature T1				
0x26	Evaporator temp. T2A				
0x27	Temperature of middle				
0x28	Timer ON				
0x29	Timer OFF				
0x2A	Accessibility functions				

0x2B	Fault	
0x2C	Protection	
0x2D	Power consumption	
0x2E	Indoor unit capacity demand	
0x2F—0x3F (Reserved)		
#n indoor unit		
n*0x20 + 0x00	Indoor unit type info. 1	
n*0x20 + 0x01	Indoor unit type info. 2	
n*0x20 + 0x02	Running mode setting	
n*0x20 + 0x03	Fan speed setting	
n*0x20 + 0x04	Setting temperature	
n*0x20 + 0x05	Room temperature T1	
n*0x20 + 0x06	Evaporator temp. T2A	
n*0x20 + 0x07	Temperature of middle evaporator T2B	
n*0x20 + 0x08	Timer ON	
n*0x20 + 0x09	Timer OFF	
n*0x20 + 0x0A	Accessibility functions	
n*0x20 + 0x0B	Fault	
n*0x20 + 0x0C	Protection	
n*0x20 + 0x0D	Power consumption	
n*0x20 + 0x0E	Indoor unit capacity demand	
n*0x20 + 0x0F —n*0x20 + 0x1F (Reserved)		
#99 indoor adress		
0xC60	Indoor unit type info. 1	
0xC61	Indoor unit type info. 2	
0xC62	Running mode setting	
0xC63	Fan speed setting	
0xC64	Setting temperature	
0xC65	Room temperature T1	
0xC66	Evaporator temp. T2A	
0xC67	Temperature of middle evaporator T2B	
0xC68	Timer ON	
0xC69	Timer OFF	
0xC6A	Accessibility functions	
0xC6B	Fault	

0xC6C	Protection	
0xC6D	Power consumption	
0xC6E	Indoor unit capacity demand	
0xC6F–0xC7F (Reserved)		

5.3、【Read/Write integer】Control parameter (Operation function code: write 0x06 or 0x10 ; read 0x03)

Holding register (W/R)

VRF indoor unit information:					
Base add.: 0x1000, quantity data of each indoor unit: 16					
Operation address = Base address + Relative address					
Relative add.	Data name	Note			
#00 indoor unit					
0x00	Running mode setting	B0	Ventilation mode 1: ON; 0: OFF	B8	Reserved
		B1	Dehumidification 1: ON; 0: OFF	B9	Reserved
		B2	Heating mode 1: ON; 0: OFF	B10	Reserved
		B3	Cooling mode 1: ON; 0: OFF	B11	Reserved
		B4	AUTO mode 1: ON; 0: OFF	B12	Reserved
		B5	Reserved	B13	Reserved
		B6	Reserved	B14	Reserved
		B7	ON/OFF status 1: ON; 0: OFF	B15	Reserved
		bit6~bit0 mutual exclusion each other			
		4-pipe mini VRF only have floor heating mode			
0x01	Fan speed setting	B0	High fan speed 1: ON; 0: OFF	B8	Reserved
		B2	Low fan speed 1: ON; 0: OFF	B10	Reserved
		B3	Breeze speed 1: ON; 0: OFF	B11	Reserved
		B4	Reserved	B12	Reserved
		B5	Reserved	B13	Reserved
		B6	Reserved	B14	Reserved
		B7	Auto fan speed 1: ON; 0: OFF	B15	Reserved
		All bits are 0, that stands for fan motor is OFF. (bit7~bit0 mutual exclusion each other)			
0x02	Setting temperature	16~32stands for 16~32℃, other value is invalid.			
0x03	Room temp. T1	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)			
0x04	Evaporator temp T2A	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)			
0x05	Temperature of middle evaporator T2B	0~240 stands for -20~100℃. (Showing value=actual temp.*2+40)			

0x06	Accessibility functions	B0	ECO running 1: ON; 0: OFF	B8	Reserved
		B1	Auxiliary electric heater 1: ON; 0: OFF	B9	Reserved
		B2	Outward swing 1:ON,0:Off	B10	Reserved
		B3	Inward swing 1: ON,0:OFF	B11	Reserved
		B4	Super silent	B12	00: Lock OFF or no lock 01: Lock cooling 10: Lock heating
		B5	Reserved	B13	
		B6	Turbo 1: ON; 0: OFF	B14	Reserved
		B7	Light 1: ON; 0: OFF	B15	Remote lock
0x07	Error (invalid for write)	B0	E0 phase sequence error	B8	E8 fan motor error
		B1	E1 communication error	B9	E9 communication error between IDU and wired controller
		B2	E2 T1 temp. sensor error	B10	EA over-current of compressor protection (4 times)
		B3	E3 T2A temp. sensor error	B11	EB inverter module protection
		B4	E4 T2B temp. sensor error	B12	EC Reserved
		B5	E5 outdoor unit error	B13	ED outdoor unit protection
		B6	E6 zero-cross detection error	B14	EE water level detection error
		B7	E7 EEPROM error	B15	EF other error
		0x08—0x0F (Reserved)			
#01 indoor unit					
0x10	Running mode setting				
0x11	Fan speed setting				
0x12	Temperature setting				
0x13	Room temp. T1				
0x14	Evaporator temp T2A				
0x15	Temperature of middle evaporator T2B				
0x16	Accessibility functions1				
0x17	Error				
0x18—0x1F (Reserved)					
#n indoor unit					
n*16	Running mode setting				
n*16+1	Fan speed setting				
n*16+2	Temperature setting				
n*16+3	Room temp. T1				
n*16+4	Evaporator temp T2A				
n*16+5	Temperature of middle evaporator T2B				
n*16+6	Accessibility functions1				
n*16+7	Error				
(n*16+8) -- (n*16+15) (reserved)					

#99 indoor unit		
0x630	Running mode setting	
0x631	Fan speed setting	
0x632	Temperature setting	
0x633	Room temp. T1	
0x634	Evaporator temp T2A	
0x635	Temperature of middle evaporator T2B	
0x636	Accessibility functions1	
0x637	Error	
0x637--0x63F (Reserved)		

5.4. 【Reading only register】 N (0~3) outdoor unit information (Operation function code: 0x04) (Reserved)

VRF outdoor unit information:					
Base add.: 0x2000, quantity data of each indoorunit: 2					
Operation address = Base address + Relative address					
0x00	Unit type information	Bit7	ODU discriminator code	1111B	
		Bit6			
		Bit5			
		Bit4			
		Bit3	Power supply phase	1: 3-phase 0: 1-phase	
		Bit2	Main type	000: fixed, 001: inverter 010: digital 011: chiller 0100~1111: reserved	
		Bit1			
		Bit0			
0x01	Unit type information		Horse power	1~250 stands for 1~250HP	
0x02	Running mode	Bit7	corece signs 1: ON; 0: OFF		
		Bit6	Lock signs 1: ON; 0: OFF		
		Bit5	Reserved, 0.		
		Bit4	Reserved, 0.		
		Bit3	Reserved, 0.		
		Bit2	Reserved, 0.		
		Bit1	Heating mode 1: ON; 0: OFF		
		Bit0	Cooling mode 1: ON; 0: OFF		
0x03	ODU fan motor fan speed	0~9 stands for different fan speed			0 stands for no fan speed
0x04	Ambient temperature	0~240 stands for -20~100℃ , (Showing value=actual temp.*2+40)			0FFh stands for no valid data.
0x05	ODU condenser temperature T3				

0x06	High pressure sensor	0~50kg		
0x07	low pressure sensor	0~50kg		
0x08	Discharge temperature of inverter compressor A1	0~200 stands for -20~180℃ , (actual temperature+20)		
0x09	Discharge temperature of inverter compressor A2			
0x0A	Discharge temperature of inverter compressor B1			
0x0B	The quantity of indoor units	0~250		alid for master unit.
0x0C	Current of inverter compressor A	0~200 stands for 0~200A		0FFh stands for no valid data.
0x0D	Current of inverter compressor B	0~200 stands for 0~200A		
0x0E	Frequency of inverter compressor B	0~250 stands for 0~250Hz		
0x0F	Frequency of inverter compressor A	0~250 stands for 0~250Hz		
0x10	The opening degree of EXV 1	00h~07Dh stands for close~1000 opening degrees, resolution is 8 opening degrees. 0FFh stands for no data.		
0x11	The opening degree of EXV 2			
0x12	ODU solenoid valve status	Bit7	SV6 1: ON; 0: OFF	Other bits are 0.
		Bit6	SV5 1: ON; 0: OFF	
		Bit5	SV4 1: ON; 0: OFF	
		Bit4	SV3 1: ON; 0: OFF	
		Bit3	SV2 1: ON; 0: OFF	
		Bit2	SV1 1: ON; 0: OFF	
		Bit1	ST2 1: ON; 0: OFF	
		Bit0	ST1 1: ON; 0: OFF	
0x13	Discharge temperature of inverter compressor B2	0~200 stands for -20~180℃ , (actual temperature+20)		Other bits are 0.
0x14	Fault	Bit15	EF other faults	Other bits are 0.
		Bit14	H7 decrease of IDU quantity error	
		Bit13	H3 increase of ODU quantity error (valid for master unit)	
		Bit12	H2 decrease of ODU quantity error (valid for master unit)	
		Bit11	H1 communication error between 0547 and 0537	
		Bit10	H0 communication error between 0547 and DSP	

		Bit9	E9	voltage error	
		Bit8	E8	wrong ODU address error	
		Bit7	E7	reserved, 0	
		Bit6	E6	condenser temperature sensor fault	
		Bit5	E5	reserved, 0	
		Bit4	E4	ambient temperature sensor fault	
		Bit3	E3	reserved, 0	
		Bit2	E2	communication error between IDU and ODU	
		Bit1	E1	power supply phase error	
		Bit0	E0	communication error between ODUs	
0x15	Protection	Bit15	PF	other protections	Other bits are 0.
		Bit14	PE	oil balance protection	
		Bit13	PD	oil return protection	
		Bit12	PC	reserved, 0	
		Bit11	PB	reserved, 0	
		Bit10	PA	defrost protection	
		Bit9	P9	DC fan motor module protection	
		Bit8		Current protection of compressor 2	
		Bit7		Current protection of compressor 1	
		Bit6	P6	IPM module protection	
		Bit5	P5	high condenser temperature protection	
		Bit4	P4	high discharge temperature protection	
		Bit3	P3	over-current protection	
		Bit2	P2	low pressure protection	
		Bit1	P1	discharge high pressure protection	
		Bit0	P0	High discharge temperature protection	
0x16	ODU capacity demand	0~250 stands for 0~250HP			0FFh stands for no valid data.
0x17	Ammeter reading				
0x18	Ammeter reading				
0x19-0x2F	Reserved				
#1 outdoor unit					
0x30-0x48	The same to 0# outdoor unit				
0x49-0x6F	Reserved				
#2 outdoor unit					
0x60-0x78	The same to 0# outdoor unit				
0x79-0x9F	Reserved				
#3 outdoor unit					
0xA0-0xB8	The same to 0# outdoor unit				
0xB9-0xFF	Reserved				