HCD6817B Compact Weather Station

(T+RH+P+WD+WDIR+PM2.5/10+Noise)

OVERVIE

HCD6817 is designed and produced by Handan Yunnong Intelligent Agricultural Technology Co., Ltd. It innovatively realizes the meteorological standard parameters （T、RH、P、WD、WDIR、PM2.5/10、Noise）through a highly integrated structure, which can realize the 24-hour continuous online monitoring of outdoor meteorological parameters, and output the parameters to the user at one time through the digital communication interface.

APPLICATION

HCD6817B is used for the construction site construction, city roads, residential environment of makings, meteorology, the real time data such as video monitoring system.It is based on the environmental protection department of the GB 3095-2012 and GB 3096-2008 and can be real-time monitoring and control effectively for site area dust through wired or wireless way

FEATURES

1、Standard configuration monitoring T、RH、P、WD、WDIR、PM2.5/10、Noise, RS485（MODBUS ）；
2、High precision, reliable performance, suitable for outdoor weather harsh environment;
3、Parameter collection, optional wireless data collector, automatic data upload network platform, mobile phone client real-time data view；
4、Real-time monitoring of meteorological environmental data, low cost, suitable for grid distribution；
5、Small size, modular design, flexible layout；
6、Data acquisition adopts 32-bit high-speed processing chip, stable and anti-interference.

TECHNICAL SPECIFICATION

Measture item	Principle	Range	Resolution	Accuracy
Atmospheric temperature	MEMS	-40-60℃	0.1℃	±0.3℃ (@25℃，typical case)
Atmospheric humidity	MEMS	0-100%RH	0.1%RH	±3%RH (0-90%RH)
Atmospheric pressure	MEMS	300-1100hpa	0.1hpa	±0.5hpa（0-30℃）
Wind speed	Ultrasonic	0-60m/s	0.01m/s	（0-30m/s）±0.3m/s 或±3% （30-60m/s）±5%
Wind direction	Ultrasonic	0-360°	0.1°	±2°
PM2.5	Laser way	0-1000ug/m³	1ug/m³	±10%(Measurements)
PM10	Laser way	0-1000ug/m³	1ug/m³	±10%(Measurements)
Noise	MEMS	30-130dB	0.1dB	10%
Supply	12-24VDC, solar power			
Output	RS485(Modbus)			
fixed form	A) Sleeve fixed; B)Flange adapter fixed			
Power consumption	＜1W@12V			
Ingress Protection	IP66			
Main material	ASA+engineering plastics			
Mounting frame	1.5m, 3m Flange, 1.8m tripod			
GPS	Device tracking and positioning			
Data Release	PC、Telephone APP、LED、LCD TV display, etc			

MODBUS RTU COMMUNICATION PROTOCOL

Baud rate：9600

Data bits：8

Stop bit：1

Check bit：None

5.1 CRC instruction：

Among all the following instructions, the two bytes of CRC16 in MODBUS RTU protocol are as follows: the low byte comes before the high byte comes after.

In the following instructions, the sensor address 0xFF is assumed (the sensor default address is FF)

5.2 Return error code rule：

When receive error instruction (including CRC16 validation error), the sensor will not return error code. After the instruction is issued 100ms, it fails to receive issuing instruction The upper computer may consider failure and may resend the instruction.

5.3 Standard MODBUS register specification

Note: The quantity or length of register in Modbus is two bytes and 16 bits(the high byte comes first and the low byte comes last), Non - byte 8 bits are a unit.

The user shall ensure that the range of the address and the range of quantity of registers are within the system range.If it exceeded, the output of the sensor will be unpredictable. The user shall ensure that the MODBUS meets the requirements of this manual in the software design of the upper computer

Input register: read with function code 03

Address	operation	Contents	Notes
0x0001	read-only	Noise, Hexadecimal number is magnified as 10 times, such as 0x021C indicates noise of 54.0db	
0x0002	read-only	Keep	
0x0003	read-only	SO2 concentration,hexadecimal ,such as 0x0172, indicates that SO2 concentration is 370ppb.	
0x0004	read-only	NO2 concentration,hexadecimal ,such as 0x0036, indicates that NO2 concentration is 54ppb	
0x0005	read-only	CO concentration,hexadecimal ,such as 0x0A00, indicates that CO concentration is 2560ppb	

0x0006	read-only	O3 concentration,hexadecimal ,such as 0x0123, indicates that O3 concentration is 2560ppb	
0x0007	read-only	PM2.5 concentration,hexadecimal ,such as 0x0172, indicates that PM2.5 concentration is 370ug/m³	
0x0008	read-only	PM10 concentration,hexadecimal ,such as 0x0193, indicates that PM10 concentration is 403ug/m³	
0x0009	read-only	Atmospheric temperature, Hexadecimal number plus 40 then it is magnified as 100 times, such as 0x1B00 indicates 6912/100-40=29.12℃	
0x000A	read-only	Atmospheric humidity, Hexadecimal number is magnified as 100 times, such as 0x1603 indicates 5635/100=56.35%	
0x000B	read-only	Atmospheric tempress, Hexadecimal number is magnified as 10 times, such as 0x2784 indicates 10116/10=1011.6hPa	
0x000C	read-only	Wind speed, Hexadecimal number is magnified as 100 times, such as 0x0125 indicates 293/100=2.93m/s	
0x000D	read-only	Wind direction, Hexadecimal number is magnified as 10 times, such as 0x0C14 indicates 3092/10=309.2°	North is 0 °
0x000E	read-only	Rainfall, Hexadecimal number is magnified as 10 times, such as 0x0C14 indicates 2.2mm	The default is 10 minutes of rain
0x000F	read-only	solar radiation, Hexadecimal number, such as 0x0172 indicates 370W/㎡	
0x0010	read-only	illumination, Hexadecimal number is magnified as 100 times, such as 0x0123 indicates 2.91.Klux	

0x0011	read-only	ultraviolet ray, Hexadecimal number, such as 0x05 indicates 5	
0x0012	read-only	CO2, Hexadecimal number, such as 0x01F4 indicates 500ppm	
0x0013-0x001f	read-only	Keep	
0x0105	read-only	electronic compass, Hexadecimal number, such as 0x0036 indicates 54°	North is 0

Internal register: function code 03 to read; function code 06 to write.

Address	operation	Contents	Notes
0x0000	Read and write	Sensor address, range 0x01-0xff (decimal), factory set to 0xFF	

Note：The data of address indicated by hexadecimal, for example, address 20 (decimal) read and write values is 0x14

5.4 communication examples

Here is an example of using Modbus RTU command to access system registers

1.Read multiple input registers (5 live data) commands

Send：FF 03 00 09 00 05 40 15

FF	03	00 09	00 05	40 15
System address	function code	Register address	Register number	CRC16 check bit generated automatically by software

Answer：FF 03 0A 1A 57 0C 5F 27 83 00 00 0C 14 36 E0

FF	03	0A	1A 57 0C 5F 27 83 00 00 0C 14	36 E0

System address	function code	Number of bytes of data segment	Data segment data	CRC16 check bit

parse data：

0x1A57= 0x1A * 256 + 0x57= 6743
Temperature = 6743/100-40=27.43℃
0x0C5F= 0x0C * 256 + 0x5F= 3167
Humidity=3167/100=31.67%RH
0x2783= 0x27 * 256 + 0x83= 10115
atmospheric pressure=10115/10=1011.5hPa
0x0000=0
Wind speed=0/100=0.00m/s
0x0C14=0x0C * 256 + 0x14= 3092
Wind direction=3092/10=309.2°

2.Read the single input register command

Send：FF 03 00 01 00 01 C0 14

FF	03	00 01	00 01	C0 14
System address	function code	Register address	Register address	CRC16 check bit generated automatically by software

Answer：FF 03 02 02 1C 91 39

FF	03	02	02 1C	91 39
System address	function code	Number of bytes of data segment	Data segment data	CRC16 check bit

parse data：

0x021C= 0x02 * 256 + 0x1C= 540
Noise = 540/10=54.0dB

3.Read the address register command

Send：00 03 00 00 00 01 85 DB

00	03	00 00	00 01	85 DB

	function code	Register address	Register address	CRC16 check bit generated automatically by software

Answer：00 03 02 00 01 44 44

00	03	02	00 01	44 44
	function code	Number of bytes of data segment	Data segment data	CRC16 check bit

Data segment data0x0001 =01　　system address 01

4、Modify internal register（System address）Command（Modify address to 0x33）

Send：00 06 00 00 00 33 C8 0E

00	06	00　　00	00 33	C8 0E
	function code	Register address	New address	CRC16 check bit

Answer：00 06 00 00 00 33 C8 0E　（Indicates successful modification）

00	06	00 00	00　33	C8 0E
	function code	Start address	New address	CRC16 check bit

5、 Read the electronic compass (output value is the Angle between compass north and sensor north arrow)

Send：FF 03 01 05 00 01 80 29

FF	03	01 05	00　　01	80 29
Station number	function code	Register address	Register number	CRC16 check bit

Answer：FF 03 02 00 36 11 86

FF	03	02	00 36	11 86
Station number	function code	Number of bytes of data segment	Data segment data	CRC16 check bit

6、Set time of rainfall accumulation

Send：00 06 01 04　00 0A　48 21

00	06	01 04	00 0A	48　21

	function code	Start address	Time accumulation(min)	CRC16 check bit

Answer：00 06 01 04　00 0A　48 21　（Indicates successful modification)

00	06	01 04	00 0A	48　21
	function code	Start address	accumulation(min	CRC16 check bit

Note：The default immediate time is 10 mins from factury
When the cumulative time of rainfall is set to 0, the equipment does not automatically reset , but accumulates all the time. The rainfall can be reset by resetting the cumulative time of rainfall after power failure
After done sets restart the prodcuts

7、Set the declination correction（Only for the selection of electronic compass）

Send：00 06 01 03　00 05　B9 E4

00	06	01 04	00 05	B9 E4
	function code	Register address	correction angle	CRC16 check bit

Answer：00 06 01 03　00 05　B9 E4　（Indicates successful modification）

00	06	01 03	00 05	B9 E4
	function code	Start address	correction angle	CRC16 check bit

Correction Angle

The high octet represents the correction direction, 0x00 represents a positive correction, and 0x01 represents a negative correction

The lower eight are the angles that need to be corrected

Such as 0x00 05 Indicate to need to increase the output by 5 degrees
0x01 03 Indicates to need to reduce the output by 3 degrees

8、GPRSSet up network information (for the selection of GPRS)

Set up IP　AT+GPRSIP=xxx.xxx.xxx.xxx#

Setport AT+GPRSPORT=xxxxx#

Save and effect the Settings　AT+GPRSRESET

Read IP、Port　RD+GPRSADD=

9、Read the latitude and longitude information

Send AT+GPS#

Answer GPS:36.12345,N;114.12345,E#

5.5 Else

customized according to user requirement, specific requirements can consult the relevant sales.