

Compact Weather Station Pro

JW-IWS-DC Series



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Brief Introduction:

- ☞ This manual introduces the product parameters and application of the integrated series. Please read and understand carefully before use
- ☞ This manual also introduces the equipment fixed, connection and operation methods.
- ☞ This manual describes the communication protocol of the equipment.

Notice Before Use :



Incorrect identification, operation may cause equipment damage



A warning indicating that the operation may cause the equipment to fail to work properly.



Reminder marks, instructions on the use of equipment



The calibration period of SO₂/NO₂/CO/O₃/PM_{2.5}/PM₁₀ and other gas sensors is one year, which will be shortened due to bad environment or improper maintenance.

1. Product Introduction

1.1 Introduction

The integrated weather station is a standard meteorological station designed and produced by our company according to the meteorological observation standard of International Meteorological Organization (WMO). All the meteorological sensor indicators meet the meteorological industry standard of the people's Republic of China (Standard No.: QX / t1-2000), so far, it is the most comprehensive and powerful integrated meteorological station in the same industry.

The integrated weather station produced by our company adopts high-performance dual core 32-bit processor and integrates multi-channel signal acquisition channels, which can realize all-weather on-site monitoring of environmental temperature, environmental humidity, wind direction, wind speed, rainfall, air pressure, solar radiation, soil temperature, soil humidity, visibility, CO, CO₂, SO₂ and other meteorological elements.

1.2 Features

- Adapt to adapt complex weather conditions
- High accuracy, fast response
- Good appearance
- Highly integrated, easy installation
- Solid state, free maintenance
- ASA engineering plastic cover
- A variety of sensor parameters can be tailor made.
- Internal storage(customized)

1.3 Application

Our weather station widely used in meteorology, environmental protection, architecture, etc Airport, transportation, agriculture and forestry, planting, emergency, hydrology, military, warehousing, scientific research and many other fields. Compared with other manufacturers of the same type of products, the integrated weather station has the characteristics of various types of sensors, comprehensive data volume, high acquisition accuracy, fast calculation speed, stable and reliable performance. Moreover, it is small in size, light in weight, easy to carry and install, which truly realizes the intelligent weather station integrating various meteorological elements.

2. General Parameter

Working Environment	-30°C~+70°C; 0~100%
Storage Temperature	-40°C~+80°C
Ingress Protection	IP65
Shell Material	ASA engineering plastic
Cable Length	10m (in default) or other
Maximum Power Consumption	130mA@12V(without heating); 700mA@12V(heating)
Power Supply	DC12V(recommended), AC220V(customizable)
Output	RS485 Modbus-RTU; 4G wireless transmission(customizable)

Technical Parameters			
Measuring elements	Range	Resolution	Accuracy
Ultrasonic Direction	0~360°	1°	±2°
Ultrasonic Speed	0~60m/s	0.1m/s	±2%(≤20m/s); ±2%+0.03V m/s(>20m/s)
Precipitation (Tipping Bucket)	0~999.9mm	0.2mm/0.5mm	≤0.2mm
Radiation (Photoelectric)	0~2000W	1W/m ²	≤5%
Illuminance	0~200000 Lux	1 Lux	±7%
Air Temperature	-40~+123.8°C	0.1°C	±0.3°C
Relative Humidity	0~100%RH	0.10%	±2%(≤80%); ±5%(>80%)
Air Pressure	300~1100hpa	0.1hpa	±0.12hpa
CO	0~10ppm	0.001ppm	±3%FS
NO ₂	0~1ppm	0.001ppm	±3%FS
SO ₂	0~1ppm	0.001ppm	±3%FS
O ₃	0~1ppm	0.001ppm	±3%FS
PM2.5	0~500ug/m ³	0.01m ³ /min	±10%
PM10	0~1000ug/m ³	0.01m ³ /min	±10%

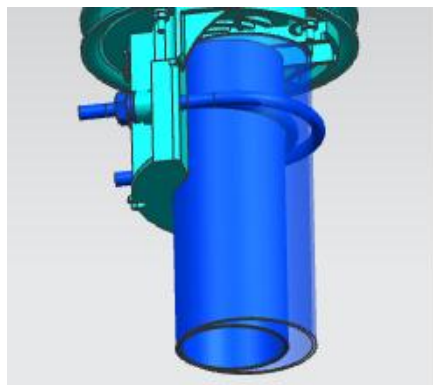
Tailor-made parametes can be also provided as below for your kind reference:

Tailor-made Parameters	Range	Resolution	Accuracy	Configuration
Dew point temperature	-40~50°C	0.1°C	Calculated value (complimentary)	Customized
Maximum temperature of the day	-40~123.8°C	0.1°C	Calculated value (complimentary)	Customized
Minimum temperature of the day	-40~123.8°C	0.1°C	Calculated value (complimentary)	Customized
2 min average wind speed	0~60m/s	0.1m/s	Calculated value (complimentary)	Customized
10 min average wind speed	0~60m/s	0.1m/s	Calculated value (complimentary)	Customized
electronic compass	0~359.9°	0.1°magnetic variation	±4°	Customized
Total radiation daily accumulation	0~99.99	0.01	Calculated value (complimentary)	Customized
Total radiation monthly accumulation	0~9999	1	Calculated value (complimentary)	Customized
Total radiation annual accumulation	0~9999	1	Calculated value (complimentary)	Customized
UV	0~500w	1W/m ²	≤5%	Customized
CO ₂	0~2000ppm	1ppm	±20ppm	Customized
Noise	30~130dB	0.1dB	±5dB	Customized
sunshine duration	0~24h	0.1h	±0.1h	Customized
Soil temperature	-50~80°C	0.1°C	±0.1°C	Customized
Soil moisture	0~100%RH	0.1%	±2%	Customized
Soil EC	0~15mS/cm	0.01	±0.5%	Customized
Soil PH	1~14PH	0.1	±2%	Customized

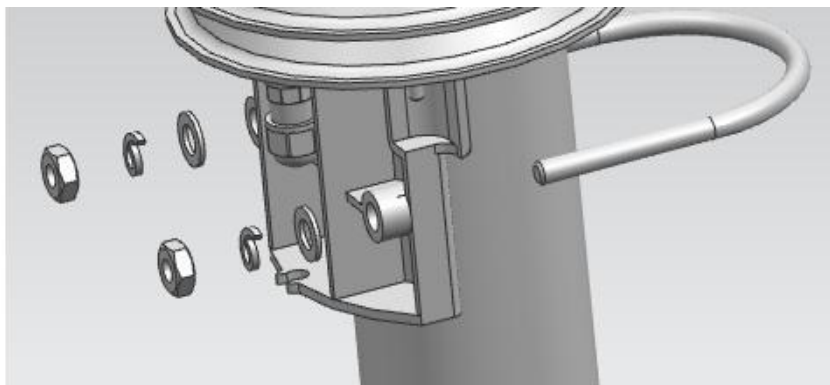
Evaporation	0-100mm	0.1mm	±1.5%	Customized
PAR	0-500W	1W/m ²	≤5%	Customized
VOC volatile matter	0-20ppm	0.001ppm	±3% FS	Customized
H ₂ S	0-10ppm	0.001ppm	±3% FS	Customized
NH ₃	0-10ppm	0.001ppm	±3% FS	Customized
CH ₂ O	0-1ppm	0.001ppm	±3% FS	Customized
Cl ₂	0-10ppm	0.001ppm	±3% FS	Customized
C ₂ H ₄ O	0-100ppm	0.001ppm	±3% FS	Customized
H ₂ O ₂	0-100ppm	0.001ppm	±3% FS	Customized
H ₂	0-1000ppm	1ppm	±3% FS	Customized
HCl	0-20ppm	0.01ppm	±3% FS	Customized
HCN	0-20ppm	0.01ppm	±3% FS	Customized
PH ₃	0-20ppm	0.01ppm	±3% FS	Customized
O ₂	0-30%VOL	0.01%VOL	±3% FS	Customized
N ₂	0-100%VOL	0.01%VOL	±3% FS	Customized
NO	0-1ppm	0.001ppm	±3% FS	Customized
ClO ₂	0-50ppm	0.01ppm	±3% FS	Customized
CH ₄ S	0-10ppm	0.01ppm	±3% FS	Customized
C ₂ H ₄	0-100ppm	0.01ppm	±3% FS	Customized
Br ₂	0-10ppm	0.01ppm	±3% FS	Customized
THT	0-50ppm	0.01ppm	±3% FS	Customized
F ₂	0-1ppm	0.01ppm	±3% FS	Customized
HF	0-10ppm	0.01ppm	±3% FS	Customized
HBr	0-20ppm	0.02ppm	±3% FS	Customized
COCl ₂	0-1ppm	0.001ppm	±3% FS	Customized
CH ₄	0-5000ppm	1ppm	±3% FS	Customized

3. Installation Instructions

The U-bolt at the bottom of the integrated weather station is used to fix the integrated weather station on the top of the circular pipe, and the outer diameter of the circular pipe is in the range of $\phi 57 \sim 70\text{mm}$. During the installation, it is necessary to ensure that the integrated weather station is firmly installed and vertical to the ground.



Pipe outside diameter range: $\Phi 57\text{-}70\text{mm}$



Install reference picture

4. Wiring Definition

Red	Blue	Yellow	Green
Power+(DC12V)	GND	RS485_A	RS485_B

5. Communication Protocol

5.1 Standard MODBUS RTU protocol

Serial Port Configuration

Baud Rate	Parity	Data Bits	Stop Bits
9600	No	8	1

Note: Default device address is 01.

5.2 Register Address

Address	Definition	Data Length	Data Type	Number of decimal places	Unit	Range
0x0000	Wind direction	2	unsigned int	0	°	0-360°
0x0001	Wind speed	2	unsigned int	1	m/s	0-60m/s
0x0002	Precipitation	2	unsigned int	2	mm	0-999.9mm
0x0003	Radiation	2	unsigned int	0	W/m2	0-2000W
0x0004	Illuminance	2	unsigned int	0	HLux	0-200000 Lux
0x0005	Air Temperature	2	signed int	1	°C	-40-123.8°C
0x0006	Relative Humidity	2	unsigned int	1	%RH	0-100%RH
0x0007	Air Pressure	2	unsigned int	1	hPa	300-1100hpa
0x0008	CO	2	unsigned int	2	ppm	0-10ppm
0x0009	NO ₂	2	unsigned int	3	ppm	0-1ppm
0x000A	SO ₂	2	unsigned int	3	ppm	0-1ppm
0x000B	O ₃	2	unsigned int	3	ppm	0-1ppm
0x000C	PM2.5	2	unsigned int	0	µg/m ³	0-500mµg/m ³
0x000D	PM10	2	unsigned int	0	µg/m ³	0-1000µg/m ³

Note: if you ordered tailor-made parameters, register address will be different with above table, all register address of tailor-made parameters will be subject to files in the U-disk along with the compact weather station.

5.3 Read Data

5.3.1 Data frame sending: upper computer → integrated weather station

Name	Byte	Data
Integrated weather station	1	0xXX:address of integrated weather station
Function code	1	0x03:Read the function code of integrated weather station data
Data area-register address high byte	1	0xXX:register address high byte
Data area-register address low byte	1	0xXX:register address low byte
Data area-read register number high byte	1	0xXX:read register number high byte

Data area-read register number low byte	1	0xXX:read register number low byte [1 length represents 2 bytes of one register data]
CRC check sum	2	CRC check

5.3.2 Data frame response: integrated weather station → upper computer

Name	Byte	Data
Integrated weather station address	1	0xXX:address of integrated weather station
Function code	1	0x03:Read the function code of integrated weather station data
Data byte length	1	0xXX:Data byte length [read data length *2 bytes]
Data area-the first register data high byte	1	0xXX:the first register data high byte
Data area-the first register data low byte	1	0xXX:the first register data low byte
Data area-the second register data high byte	1	0xXX:the second register data high byte
Data area-the second register data low byte	1	0xXX:the second register data low byte
.....	...	...
CRC check sum	2	CRC check

Note: The data area message returned by the integrated weather station contains 2 bytes of data of one channel, and the sequence of the channel data is the sequence of the point table attached to each integrated weather station equipment. The data of the channel is divided into unsigned int and signed int (such as temperature data for signed int data).

5.3.3 For example

Default device address is 01.

Host command: 01 03 00 00 00 0E C4 0E

Slave response: 01 03 1C 00 32 00 C8 08 CA 03 E8 05 DC 01 43 01 A7 27 1A 01 2C 01 40 00 EA 00 B9 00 D2 01 AE 07 7A

Address	Definition	Content	Remark
0x0000	Wind direction	0 decimal places,0X0032 means 50°	If reserved, then data will be 0X0000
0x0001	Wind speed	1 decimal places,0X00C8 means 20.0m/s	If reserved, then data will be 0X0000
0x0002	Precipitation	2 decimal places,0X08CA means 22.5mm	If reserved, then data will be 0X0000
0x0003	Radiation	0 decimal places,0X03E8 means 1000W/m ²	If reserved, then data will be 0X0000
0x0004	Illuminance	0 decimal places,0X05DC means 1500HLux=150000Lux	If reserved, then data will be 0X0000
0x0005	Air Temperature	1 decimal places,0X0143 means 32.3℃	If reserved, then data will be 0X0000
0x0006	Relative Humidity	1 decimal places,0X01A7 means 42.3%RH	If reserved, then data will be 0X0000
0x0007	Air Pressure	1 decimal places,0X271A means 1001.0hPa	If reserved, then data will be 0X0000
0x0008	CO	2 decimal places,0X012C means 3.000ppm	If reserved, then data will be 0X0000
0x0009	NO ₂	3 decimal places,0X0140 means 0.320ppm	If reserved, then data will be 0X0000
0x000A	SO ₂	3 decimal places,0X00EA means 0.234ppm	If reserved, then data will be 0X0000
0x000B	O ₃	3 decimal places,0X00B9 means 0.185ppm	If reserved, then data will be 0X0000
0x000C	PM2.5	0 decimal places,0X00D2 means 210μg/m ³	If reserved, then data will be 0X0000
0x000D	PM10	0 decimal places,0X01AE means 430μg/m ³	If reserved, then data will be 0X0000

Note: if you ordered tailor-made parameters, register address and host command will be different with above table, all register address of tailor-made parameters and host command will be subject to files in the U-disk along with the compact weather station.

5.4 Set up time

5.4.1 Data frame sending: upper computer → integrated weather station

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set the parameter function code
Sets high byte of register starting address	1	0x02:Sets register high byte (fixed)
Sets low byte of register starting address	1	0x00:Set register low byte (fixed)
Sets register number to high bytes	1	0x00:Register number high bytes (fixed)
Sets register number to low byte	1	0x03:Register number low bytes (fixed)
Data byte length	1	0x06:Length of data bytes (fixed)
Data area-year	1	0xXX:year eg:0x16 means 2016year
Data area-month	1	0xXX:month eg:0x07 means July
Data area-day	1	0xXX:day eg:0x25 means 25th
Data area-hour	1	0xXX:hour eg:0x08 means 8:00
Data area-minute	1	0xXX:minute eg:0x37 means 37 minute
Data area-second	1	0xXX:second eg:0x56 means 56 second
CRC check sum	2	CRC check

5.4.2 Data frame response: integrated weather station → upper computer

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set the parameter function code
Sets high byte of register starting address	1	0x02:Set register high byte (fixed)
Sets low byte of register starting address	1	0x00:Set register low byte (fixed)
Sets register number to high bytes	1	0x00:Data length high bytes (fixed)
Sets register number to low byte	1	0x03:Consistent with the byte of the received message
CRC check sum	2	CRC check

If the integrated weather station receives the "Set Time Message" sent by the host computer, it is wrong

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x90:Set the parameter function code +0x80
Data area-data error code	1	0x01:The date sent by the host computer is wrong 0x02:The host computer send time error 0x03:The length of message data sent by the host computer is wrong
CRC check sum	2	CRC check

5.5 Set device address

5.5.1 Data frame sending: upper computer → integrated weather station

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set the parameter function code
Sets the high byte of the register starting address	1	0x05:Set register high byte (fixed)

Sets register starting address low byte	1	0x01:Set register low byte (fixed)
Sets register number to high bytes	1	0x00:Number of registers high in bytes (fixed)
Sets register number to low byte	1	0x01:Register number low bytes (fixed)
Data byte length	1	0x02>Data byte length (fixed)
Data area-correspondence address	1	0xXX:The address to communicate with the host computer (1~254)
Data area-spare	1	0x00:Meaningless, spare
CRC check sum	2	CRC check

5.5.2 Data frame response: integrated weather station → upper computer

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set the parameter function code
Sets the high byte of the register starting address	1	0x05:Set register high byte (fixed)
Sets register starting address low byte	1	0x01:Set register low byte (fixed)
Sets register number to high bytes	1	0x00:Number of registers high in bytes (fixed)
Sets register number to low byte	1	0x01:Consistent with the byte of the received message
CRC check sum	2	CRC check sum

If the integrated weather station receives the message [setting communication address] sent by the host computer, it is wrong

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x90:Set the parameter function code+0x80
Data area-Data error code	1	0x01:Means Error in communication address (address 0x00 or 0xff) which send by upper device 0x02:Indicates register address error 0x03:The length of message data sent by the host computer is wrong
CRC check sum	2	CRC check

5.6 Set baud rate

5.6.1 Data frame sending: upper computer → integrated weather station

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set the parameter function code
Sets the high byte of the register starting address	1	0x05:Set register high byte (fixed)
Sets register starting address low byte	1	0x03:Sets register low byte (fixed)
Sets register number to high bytes	1	0x00:Number of registers high in bytes (fixed)
Sets register number to low byte	1	0x01:Register number low bytes (fixed)
Data byte length	1	0x02:Length of data bytes (fixed)
Data area-communication baud rate flag	1	0xXX:Communication protocol 【description】 0x01:4800 0x02:9600 0x03:19200

		0x04:38400 0x05:57600 0x06:115200
Data area-spare	1	0x00:Meaningless, spare
CRC check sum	2	CRC check

5.6.2 Data frame response: integrated weather station → upper computer

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x10:Set parameter function code
Sets the high byte of the register starting address	1	0x05:Sets register high byte (fixed)
Sets register starting address low byte	1	0x03:Set register low byte (fixed)
Sets register number to high bytes	1	0x00:Number of registers high in bytes (fixed)
Sets register number to low byte	1	0x01:Consistent with the byte of the received message
CRC check sum	2	CRC check

If the integrated weather station receives the message [setting communication address] sent by the host computer, it is wrong

Name	Byte	Data
Integrated weather station address	1	0xXX:Integrated weather station address
Function code	1	0x90:Set the parameter function code+0x80
Data area-data error code	1	0x01:Error indicating the baud rate signal sent by the host computer 0x02:Indicates register address error 0x03:The length of message data sent by the host computer is wrong
CRC check sum	2	CRC check

6. Precautions and maintenance

- 1) Please check whether the package is in good condition and check whether the product model is consistent with the model selection;
- 2) Do not connect with electricity. Power on only after wiring is completed and checked to be correct;
- 3) When using, do not change the components or wires that have been welded before leaving the factory;
- 4) Lightning protection measures: the integrated weather station system needs to be within the scope of lightning protection, and it will take corresponding measures to protect other induced lightning hazards. During the installation process, it is necessary to pay attention to reliable and reasonable grounding to eliminate over-voltage, over-current and lightning magnetic pulse at the periphery of the equipment;
- 5) For the wiring of 220V municipal power supply, the safety of power consumption and the appearance effect of the installation site should be considered.
- 6) Please do not disassemble the sensor or touch the sensor surface with sharp objects or corrosive liquid to avoid damaging the product.
- 7) Regularly monitor and clean the integrated ultrasonic probe and louver box to see if there are foreign

matters covered. Power off operation is required to clean the dust on the panel and the dirt in the aviation socket.

8) Please keep the verification certificate and certificate, and return it with the product during maintenance.

9) During installation, the louver box must be installed vertically with the ground. If there is an inclination angle during installation, it will enter rain and snow in rainy and snowy weather, and the data will be easily affected by water vapor.