A70H-UWS

Automatic Weather Station Manual

A70H-UWS is an automatic weather station that can measure wind speed, wind direction, atmospheric pressure, humidity, temperature; rainfall and solar radiation (optional). Wind speed and direction are measured with ultrasonic waves. The optional rainfall detection uses 24G radar, which can quickly detect rainfall and intensity.

Welcome to the Comptus A70H-UWS Automatic Weather Station. The instrument does not have any moving parts, needs no maintenance, and no on-site calibration. In order to get the most out of your instrument, we recommend you read this manual carefully before installation.

The instrument can be used with computers, data collectors or other acquisition devices that are compatible with the communication format provided with the specific instrument you have purchased (RS232 or RS485).

Sensor	Technical Specifications		
	Range	Resolution	Accuracy
Wind Speed	0-60m/s	0.01m/s	+/-2%
Wind Direction	0-360°	1°	+/-3°
Temperature	-40°- +80° C	0.1°C	+/- 1°C
Humidity	0-100% RH	0.1%RH	+/-2%
Pressure	150-1100 hPa	0.1hPa	+/-1 hPa
Rainfall	0-10mm/Min	0.01mm	+/-0.4mm
Solar Radiation	0-1750W/m2	1W/m2	+/-5%
Supply	12-24VDC		
Output (Modbus-RTU)	RS485, RS232		
Data update cycle	1s(default) other optional		
Power consumption	<3W; Heating power: 6W		
Operating temperature	-40°- +80° C		
EMC	EN61000-6-3, EN61000-3-3, EN61000-3-2, EN61000-6-1		
IP Rating	IP65		
Main Material	ABS		

Installation Recommendations

The A70H-UWS is suitable for use in a wide range of environments and under normal operating conditions does not require field calibration or maintenance.
Check regularly to ensure that the unit is not impacted by nearby equipment that may interfere with operation including radar or radio transmitters, marine engines, generators, etc.
Maintain a distance of 2m or more from any radar scanner or radio antennas;
Use the cables provided with the sensor for optimum performance;
If the cable is cut or not properly connected EMC shielding may be compromised;
A ground loop is not required if the unit is connected according to installation instructions;
Ensure continuous power supply to the A70H-UWS to ensure proper operation;
Avoid installation near obstacles. Mount on the prevailing wind side of structures whenever possible. Recommended mounting position is 10 meters above ground in an open area free from any obstructions. Open area is defined as the distance between the wind sensor and any obstacle should be => 10 times the height of the obstacle. If mounted on a building the sensor should theoretically be installed at a height 1.5 times the height of the building. The length of a horizontal boom shall place the sensor at least twice the diameter/diagonal of the tower/mast. The boom needs to be mounted on the prevailing wind side of the tower/mast.

For detailed information on best practices for siting of meteorological sensors download this brochure from the World Meteorological Organization:
https://www.weather.gov/media/epz/mesonet/CWOP-WMO8.pdf

Land (stationary) Installation
It is recommended to install the A70H-UWS on a vertical mast. The sensor base is suitable for mounting on a 1.5” EMT or 1.25” NPT pipe. The mast should have three holes drilled to align with the three mounting holes in the base of the sensor. The holes should be located 7.5mm/.295” from the mast top.

Alignment
There is a raised arrow indicating North on the sensor, with a corresponding red dot on the underside of the sensor to aid in positioning. Use a compass during installation to ensure proper alignment.

For indoor use, the sensor can be installed on any plane to measure wind speed and direction.

Electrical Connection

The connector is either 4 pin for RS485 or 5 pin for RS232. Align the indent on the wire connector with the ridge in the connector on the base of the sensor. Push in, then screw the outer protective sleeve into place. Excessive force should never be used. Finger tightness is adequate for most applications.

RS485 connection			
Red	Blue/Black	Yellow	Green
DC 12V+	DC 12V-	RS485 DA+	RS485 DB-

RS232 Connection				
Red	Blue/Black	Yellow	White	Brown
DC 12V+	DC 12V-	RS232TX	RS232GND	RS232RX

Use proper strain relief and drip loops on sensor cables at all times.

Mobile Installation

The North, or red dot position should face the forward position (bow or heading) of the vessel. Ensure the sensor is mounted on a vertical mast at least 2 meters away from surrounding objects that may disturb or restrict air flow.

Cleaning

If dust collects on the instrument, it can be lightly brushed with a cloth using soft biodegradable lotion. Do not use dissolving reagents or solvents, and carefully clean to avoid scratching the surface of the instrument. Snow or ice should be gently brushed off. Any hard accumulation should be allowed to dissolve away through natural conditions. Do Not use hard tools to remove ice or snow.

Service

The instrument has no moving parts, and does not require routing maintenance. If the sensor is opened or the safety seal is damaged, any warranty or calibration service will be voided. If there is any problem with the sensor contact Comptus for troubleshooting assistance, or a return authorization code.

Communications Protocol
(See Attachment)

A70H-UWS Communication Protocol

Communication parameters: Baud rate: 9600; Data bits: 8 bits; No parity bit

When the weather station receives the correct data frame, it replies with the corresponding content. If there is an invalid data frame , the weather station does not reply with any content. No reply is convenient for multiple weather stations to go with 485 bus networking, avoiding data communication conflicts.

Instrument Internal Register Description

Register	Byte Length	Conception	Type	Range
1	16 bit	Device Status	Integer type	0xA000~0xA03F
2	16 bit	Wind Direction	Integer type	0-359˚
3.4	32 bit	Wind Speed	Float point type	0-60m/s
5.6	32 bit	Air Temp.	Float point type	-40~+80˚C
7.8	32 bit	Air Humi.	Float point type	0-100%RH
9.10	32 bit	Air Pressure	Float point type	150-1100hPa
12	16 bit	Rain/Snow	Integer type	0x0000~0x000F
12.14	32 bit	Rainfall	Float point type	100mm/h
15.16	32 bit	Rainfall Acc.	Float point type	
17	16 bit	Rainfall Unit	Integer type	

Read real time data

Client sends:
01 03 00 00 00 11 85C6

Weather station returns:
01 03 22 A0 17 00 38 C2 8F 3C F5 33 33 41 E7 66 66 42 74 3E 14 44 68 00 0C 00 01 66 66 42 56 00 00 42 F7 02 01 873F

Description of Return data format

No.	Conception	offset	Byte Number	Description	Remarks
1	Address block	0	1	Address(0x01)	0x01
2	Function code	1	1	Only read(0x03)	0x03
3	Number of bytes	2	1	0x22	34bytes
4	Device status	4	2	0xA0 0x17	
5	Data block	6	2	Channel 1 (Wind direction)	0x0038(56˚)
		10	4	Channel 2 (Wind speed)	0x3CF5C28F(0.03m/s)
		14	4	Channel 3 (Air Temp.)	0x41E73333(28.9˚C
		18	4	Channel 4 (Air Humi.)	0x42746666(61.6%)
		22	4	Channel 5 (Air pressure)	0x44683E14(929.0hPa)
		24	2	Channel 6 (Rain/Snow)	0x0001 (Rain)
		28	4	Channel 7 (Rainfall)	0x42566666 (53.6mm/h)
		32	4	Channel 8 (Rainfall acc.)	0x42F70000 (123.5mm)
		34	2	Channel 9 (Rainfall unit)	0x0201 (mm/h)
6	Check block	38	2		0x87 0x3F

Rainfall unit (Factory Settings)
0x0000:mm/s
0x0001:mm/m
0x0002:mm/h

Rain/Snow
0x0001:Rain
0x0002:Snow
0x0004:solid(such as hail)

Clear Rainfall Acc.
Client sends
01 10 00 0F 00 02 04 00 00 00 00 B3 EF

Weather Station Return
01 10 00 0F 00 02 71 CB

Instrument configuration (user can choose ASCII or Hex)

Through the connection with the instrument, some parameters of the instrument can be configured, such as changing the communication address and changing the Baud rate

Command one: Enter the Settings mode

Sent

(ASCII) >*\r\n

(Hex) 3E 2A 0D 0A

Response

(ASCII) \n>CONFIGURE MODE\r\n

(Hex) 0A 3E 43 4F 4E 46 49 47 55 52 45 20 4D 4F 44 45 0D 0A

Command two: Set the serial port configuration

Sent

(ASCII) >CUS 9600 8-N-1\r\n

(Hex) 3E 43 55 53 20 39 36 30 30 20 38 2D 4E 2D 31 0D 0A

Response

(ASCII) >CMD IS SET\r\n

(Hex) 3E 43 4D 44 20 49 53 20 53 45 54 0D 0A

Note: The CUS is required followed by the serial port parameters that will need to be set. If it is not followed by the parameters, the command becomes the current query configuration. (such as sent: '>ID\r\n',Response:' \n>COM USART SET : 9600 N-8-1\r\n')

Command three: Set the address

Sent

(ASCII) >ID 2\r\n

(Hex) 3E 49 44 20 32 0D 0A

Response

(ASCII) >CMD IS SET\r\n

(Hex) 3E 43 4D 44 20 49 53 20 53 45 54 0D 0A

Note: This 2 is the address you want to set (set according to the need, 1-255), which must be in decimal format. If "ID" is not followed by address, the command becomes the current query address (Such as sent: >ID\r\n, Response: ID(HEX) : 02\r\n

Command four: Reset

Sent:

(ASCII) >RESET\r\n

(Hex) 3E 52 45 53 45 54 0D 0A

After the instrument receives this command successfully a soft reset is performed.

Command five: Manually exit the Settings mode

Sent:

(ASCII) >!\r\n

(Hex) 3E 21 0D 0A

Response:

(ASCII) \n>NORMAL MODE\r\n

(Hex) 0A 3E 4E 4F 52 4D 41 4C 20 4D 4F 44 45 0D 0A

Steps:

Set the address

'Command one' => 'Command three' => 'Command five' => 'Command four'

Set the serial port configuration

'Command one' => 'Command two' => 'Command five' => 'Command four'

Note:

1. There are two spaces in the 'CUS 9600 8-N-1' to note. '8-N-1' contains no spaces.

Baud rate	Data Bits	Parity	Stop Bits
2400-115200	8	N: NONE; E: EVEN; O: ODD	1 2

2. Any setting instruction (2,3) must first let the instrument enter the settings mode. Inputs must be entered within 15 seconds or the settings mode will automatically close. After inputs are successfully entered, the reset restart will begin after 15 seconds.

3. After setting the instrument, "Command four" must be sent to make the instrument soft reset before the new settings can take effect.

4. "\r\n" is the carriage return line feed, corresponding to the HEX (0x0D, 0x0A)

Installation Questions and Troubleshooting
Contact sales@comptus.com, or call +1 603-726-7500
202 Tamarack Rd.
Thornton, NH 03285-6867