Instruction Manual

Pictured:
A70H-USD

This Manual covers:

A70H-USD/2
A70H-USD/4
A70H-USD/L
A70H-USD/V

The A70H-USD is an ultrasonic sensor that measures wind speed and direction.

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. 4-20mA (standard) or 0-5V, RS232, RS485 (optional)

APPLICATIONS

-Building Automation and Controls
-Environmental Monitoring -
Data Collection

SPECIFICATIONS

Range: Wind Speed - 0-45m/s, 0-60 m/s
                 Wind Direction - 0-360º
Resolution: Wind Speed - 0.01m/s
                 Wind Direction - 1º
Accuracy: Wind Speed - ≤10m/s - ±0.2m/s
                         >10m/s - <±0.2m/s of the current value
Starting Threshold: Wind Speed - 0.1m/s
                         Wind Direction - 0.1m/s
Electrical: Power Supply - 12-24 VDC
                  Output Signal - 4-20 mA; RS232/RS485 (MODBUS/NEMA-0183), 0-5V
                  Power Consumption - 24V @ 60 mA
                  Heating Power (Optional) - 3W
                  Electronic Compass - Optional
Operating Temperature: -30ºC to 70ºC
Ingress Protection: IP65/NEMA4
 Atmospheric Pressure - 150-100hPa (Optional)
Storage Conditions: 10ºC to 60ºC @ 20% to 90% R.H.
Materials: ABS Engineering Plastic
 Weight: 0.8 kg (1.75 lbs)
Dimensions: 145mm x 138mm

INSTALLATION RECOMMENDATIONS:

The A70H-USD 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-USD 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-USD 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 approx. 6.5mm/.256" 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 speed and direction of air movement.

ELECTRICAL CONNECTION:

The connector is either 5 wire for 4-20 mA, 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.

Wiring

CABLE	VOLTAGE	CURRENT	RS485
RED	V+	V+	V+
BLUE	V-	V-	VRS485A
BROWN	Signal (WS)	Signal (WS)	RS485B
YELLOW	Signal (WD)	Signal (WD)	N/A
WHITE	Signal GND	Signal GND	

RS232 Connection

BROWN

RED   BLUE/BLACK   YELLOW   WHITE   DC   12V-

DC 12V+   RS232TX   RS232GND   RS232RX

OUTPUT CHARACTERISTICS:

Current (4-20mA)

Characteristic transfer function:

$V(m/s)=(ls-4)/(20-4)*Range;$

$A(°)=(ld-4)/20-4)*360(Range:0-360°)$

(V: wind speed, ls: wind speed current (mA), A: wind direction, ld: wind direction current (mA))

Voltage

characteristic transfer function:

$V(m/s)=Us/(full\ scale\ voltage-zero\ point\ voltage)*Range;$

$A=(°)=Ud/(full\ scale\ voltage-zero\ point\ voltage)*360\ (Range:\ 0-360°)$

V: wind speed, Us: wind speed current (mA), A: wind direction, Ud: wind direction current (mA)

OUTPUT CHARACTERISTICS:

(Continued)

Communication parameters: Baud rate: 9600; Data bits: 8 bits; Stop bit: 1, Check bit: no Slave address: the factory default is 01H (set according to your requirement, 00H, FFH)

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

Registers start at 0. For example: 03 Function code register 1 is 40001 in the actual register.
The 03H Function Code Example: Read The Wind Speed & Wind Direction Host Scan Order (slave address: 0x01)
F5 03 00 51 00 01 80AE

Wind direction: (00C2)H=(194)D=194(°)
Wind speed: (0094)H=(148)D, 148/100-1.48(m/s);

The 06H Function Code Example: Modify the slave address Host Scan Order (Changed from 09H to 01H):
09 06 00 42 00 01 E956

Slave Response:
09 06 00 42 00 01 E956

If you forget the original address, you should use the broadcast address (00H) (ensure that no other devices are on the bus at this time).

The 06H Function Code Example: Modify the band rate Host Scan Order (Change to 19200)
09 06 00 40 00 05 4955

Slave Response:
09 06 00 40 00 05 4955

The 06H Function Code Example: Modify the check bit and stop bit

Host Scan Order (Change to NONE, 1):
09 06 00 41 00 03 9897

Note:
All underlined is fixed bit;
The last two bytes is CRC check command;

If you changed the address, restart the device to take effect.
Use proper strain relief and drip loops on sensor cables at all times.

CODE	BAUD RATE		CODE	DATA BIT	CHECK BIT	STOP BIT	Mobile
0	1200		0	8	NONE		
1	2400		1	8	ODD	2	
2	4800		2	8	EVEN	1	
3	9600		3	8	NONE	1	
4	14400					1	
5	19200						
6	28800						
7	38400						
8	56000						
9	57600						
10	115200						

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 routine 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.