



Ultrasonic Wind Gauge

User's Manual



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1. Introduction

Ultrasonic Wind Gauge is an one axis ultrasonic anemometer. The instruments measure the transit time of the ultrasonic pulse between a pair of opposite sonic transducers, in both directions. From the measurement of t_F and t_B times, you can trace to the wind speed component in the direction of the two transducers, through the formula:

$$V = D/2 \cdot (1/t_F - 1/t_B)$$

Where:

D = distance between the two transducers

t_F = forward transit time

t_B = backward transit time

This formula assures that the wind speed does not depend on Pressure, Temperature and Humidity.

2. Features

The main features of Ultrasonic Wind Gauge are:

- Two communication Interfaces:
 - “Remote” port and “Input/Output” port
- LCD display of average wind speed (parallel with runway or sprint straightway)
- Similar display and interface capability as 730G Gill Athletics, Inc. vane style wind gauge:
 - Powered by 4 x 3AA cells
 - Automatic interface to Finish Lynx
 - 5 sec. averaging for Long Jump & Triple Jump
 - 10 sec. averaging for 100M Event & 200M Event
 - 13 sec. averaging for 100M Hurdles & 110M Hurdles
- Continuous wind reading option
- Remote starting option via 6 meter cable



3. Specifications:

PARAMETER	SPECIFICATION
Velocity Range	0.01m/s - 20.0m/s
Velocity Resolution	0.01 m/s
Digital Output	“Remote” port: RS232 “Input/Output” port : RS422/RS485
Communication Protocol	9600 Baud, 7 data bits, even parity, 1 stop bit
Connection for Communication	9 pin similar to 730G
Power Supply	4 x 3AA cells (rechargeable, zinc carbon or alkaline)
Battery Life	Approximately 20 hours continuous operating use with new alkaline disposable cells ⁽¹⁾
AC adapter	110V – 240V
Dimensions	285 x 158 x 72 mm (Fit in Gill Athletics, Inc. carry case - foam lined)

(1) Battery Life may vary under continuous wind reading mode.



4. Operating Mode:

Items	Event	Interval
1	100M Event	10 sec
2	200M Event	10 sec
3	100M Hurdles	13 sec
4	110M Hurdles	13 sec
5	Long Jump	5 sec
6	Triple Jump	5 sec
7	Continuous	1 sec

5. Setup

5.1 START button:

At the “Ready-START” prompt, push the **START** button to take a wind speed measurement. The wind gauge will then countdown a pre-programmed period of time, depending on event, and display the average wind speed in m/sec.

5.2 RESET button:

The **RESET** button will allow you to go back to the Ready-START prompt. If you wish to go back to the Select Event prompt push the **ENTER** button.

5.3 ENTER button:

After the measurement is displayed, push the **ENTER** button to return to the Select Event prompt or use the **START** button to take another wind speed measurement.



5.4 R buttons:

At the “Select Event” prompt, push the button it shows “100M Event” – “200M Event” – “100M Hurdles” – “110M Hurdles” – “Long Jump” – “Triple Jump” – “Continuous” – “100M Event” in a cyclic sequence.

5.5 L buttons:

At the “Select Event” prompt, push the button it shows “Continuous” – “Triple Jump” – “Long Jump” – “110M Hurdles” – “100M Hurdles” – “200M Event” – “100M Event” – “Continuous” in a cyclic sequence.

6. Communication Ports:

The Ultrasonic Wind Gauge has two communication ports for automatic interaction with other devices through direct connection.

The two receptacles on the left side panel labeled “REMOTE” and “INPUT/OUTPUT” provide the physical connection.

6.1 REMOTE port:

A remote device connected to this port will receive wind speed data automatically at the end of each wind speed measurement. Typically this port is used by large-character remote display units and scoreboards. The device must be RS232 compatible and be programmed to receive the formatted data streams.

6.2 INPUT/OUTPUT port:

A remote device connected to this port may both receive and send information to and from the wind gauge via serial communication. The wind gauge may be started, the time interval for wind speed measurement may be set or reset, and the most recent wind gauge measurement may be requested by the communicating device. Typically this port is used by photo-finish systems and networked computer-based scoreboard systems.



7. Communication Protocols:

This protocol is for the exchange of data between FinishLynx and a ultrasonic wind gauge. Port settings of 9600 baud, 7 data bits, even parity bits, and 1 stop bit are used.

7.1 Data format from FinishLynx

```
<0x01><0x13>CW<opcode><0x02><data><0x04>  
<opcode> = R | S | I | O  
<data> = <digit><digit>  
<digit> = 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
```

Opcode :

R – Reset.

<data> = nothing, send '00'

S – Start. Begin taking a wind reading.

<data> = nothing, send '00'

I – Interval. Set the length of the next reading.

<data> = number of seconds

O – Output. Send the most recent reading.

<data> = nothing, send '00'

7.2 Data format from Ultrasonic Wind Gauge

```
<0x01><0x13>GW<0x02><0x10>0013<reading><0x04>  
<reading> = <sign><digit><digit>.<digit><digit>  
<sign> = + | -  
<digit> = 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
```

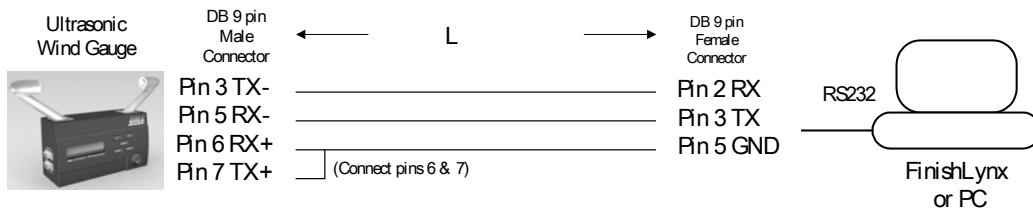


8. Communication Interfaces

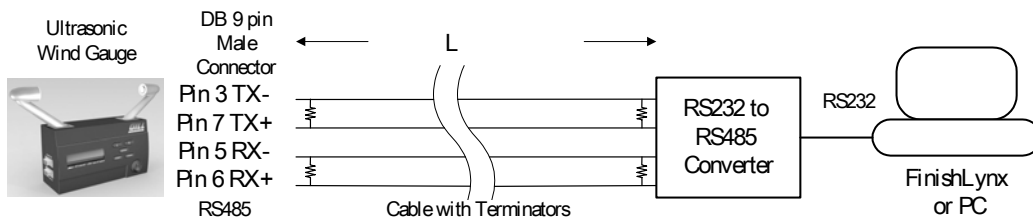
The ultrasonic wind gauge transmits wind speed information to a computer via the serial communication port labeled INPUT/OUTPUT on the left side panel of the wind gauge. This serial communication port has RS485 line drivers for long distance communication (up to 450 m).

Computer interface connection instructions:

1. Plug the serial communication cable (9 pin D-Subminiature, male connector) into the INPUT/OUTPUT connector on the left side of the ultrasonic wind gauge. The FinishLynx computer system, and most PCs, also utilize 9 pin D-Subminiature sockets for serial communication ports.
2. The cable and connector pin connections for **short distance communication** ($L < 12$ m) are as follows:



3. **Long distance communication** ($L > 12$ m) requires an RS232 to RS485 converter to boost the computer or FinishLynx signal. The cable and connector pin connections are as follows:



4. Configure the computer for transmission as follows: **Baud Rate = 9600; Data Bits=7; Parity=Even; Stop Bits=1.**
5. The power consumption in long distance communication will be much greater than that in short distance communication. Therefore, it is suggested to use AC adaptor for long distance communication. (Batteries are not necessary to be removed from compartment)