# Manual

# Wind Monitor Instrument

# Model 6533A

## Revision History

| File name / Revision | Date | Authors & Change Details | Checked/ Approved |
|---|---|---|---|
| Previous version BX | 2004 | RS/ JH | MS |
| Unidata Manual - 6533 RM Young Wind Instrument Issue 2.0 | 2007 | AB/CB/JH/MS/KC | MS |
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| | | | |

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# 1.0 INTRODUCTION

The Wind Monitor Instrument (Model 6533A) is a high performance wind speed and direction sensor designed specifically for air quality measurements. It is manufactured by RM Young Company. With modifications by Unidata, it may be used with any of the data loggers in the Starlog range.


This manual describes the installation and operation of the Wind Monitor.

## 1.1 Operating Principles

The Wind Monitor combines simplicity and lightweight corrosion resistant construction with low threshold, fast response and excellent fidelity.

The wind speed sensor is a four blade helicoid propeller. Propeller rotation produces an AC sine wave voltage signal with frequency directly proportional to wind speed. Slip rings and brushes are not used. A micro-power interface circuit, housed in a convenient junction box on the mounting post, converts the AC sine wave to a 5V digital signal, suitable for connection to a datalogger.

The wind direction sensor is a lightweight vane with sufficiently high damping ratio and low aspect ratio to assure excellent fidelity in rapidly fluctuating winds.

Vane position is sensed by a precision conductive plastic potentiometer. With a known excitation voltage applied to the potentiometer, the output signal is directly proportional to the azimuth angle.

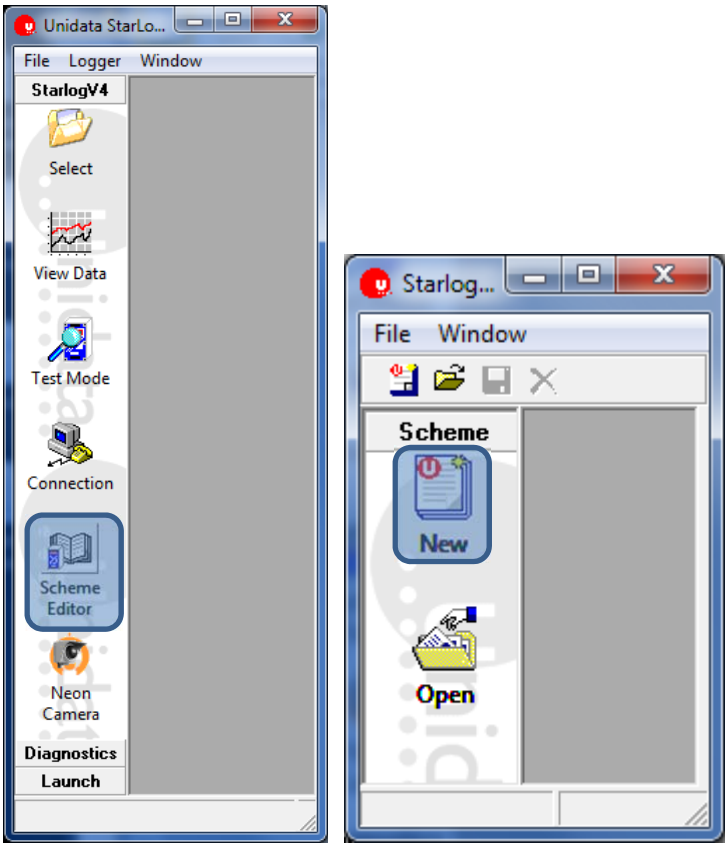
## 2.0 USING THE WIND MONITOR IN A STARLOG SCHEME

The Model 6533A Wind Monitor can be connected to Starlogger or Prologger datalogger to provide valuable wind speed and wind direction data in a Starlog data logging system.

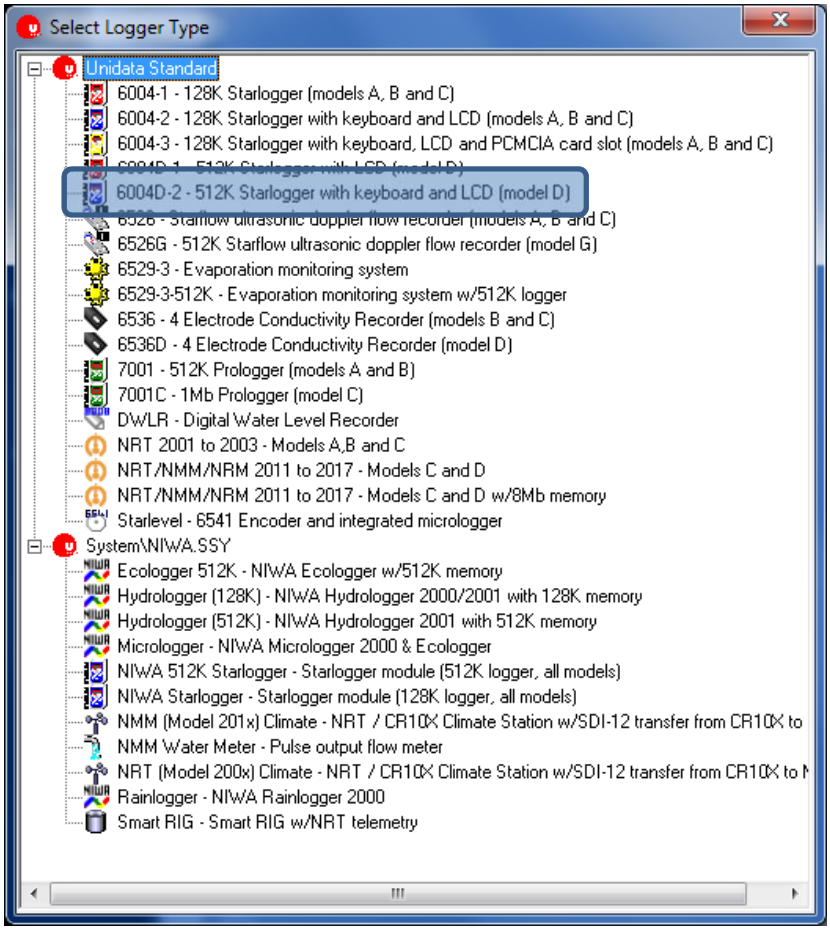
To use the Wind Monitor in a Data Logging System, you first define what and when to log using Starlog Software. Data sensed by the Instrument is then logged according to the scheme you define

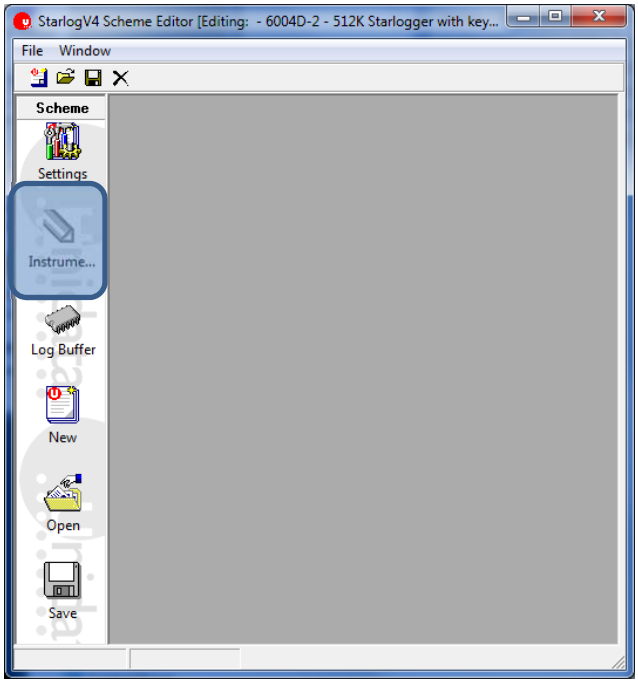
### 2.1 Adding an Instrument

To create a Scheme for monitoring wind speed and wind direction, open the **Scheme Editor**, then use the **Instruments** window to add the Wind Monitor.

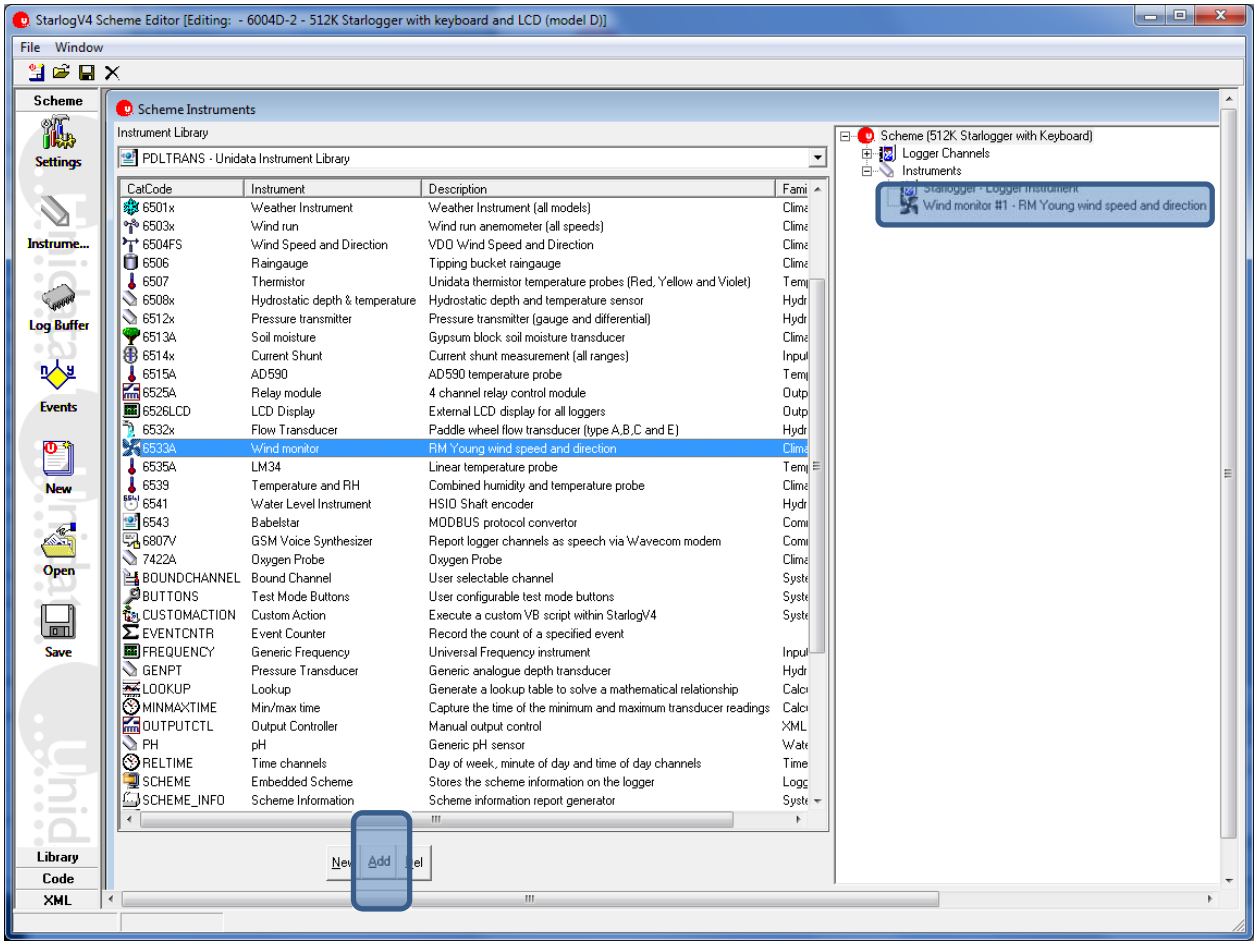


Select logger that you intend to use (e.g.6004-2 512K Starlogger), select Instruments



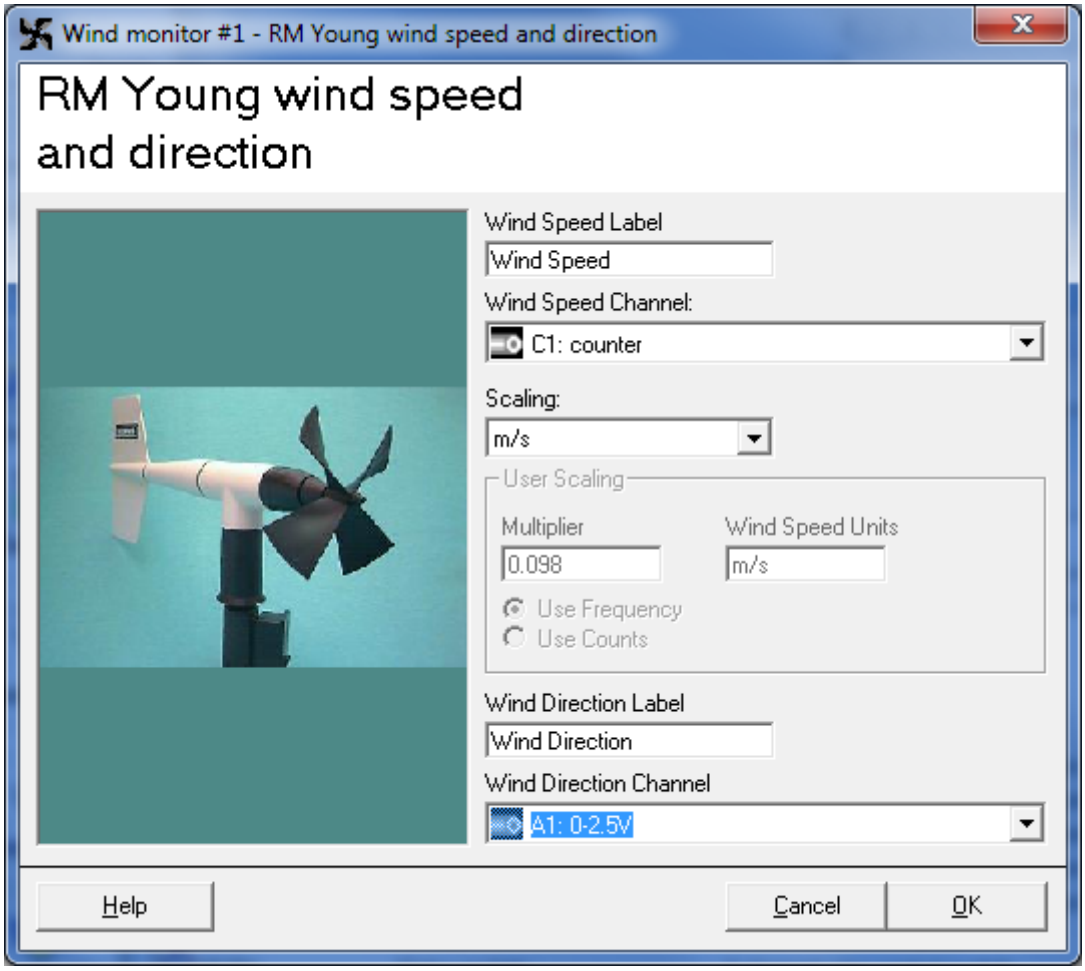
Select 6533A wind monitor scheme and Add




Double click on selected scheme

Select counter channel for wind speed and analog channel for wind direction

OK




Save scheme and program logger with the sceme.

## 2.2 Set Counter Channel Prescale to Equal Scan Rate

The wind speed output is connected to one of the counter channels. The prescale value of this counter channel should be set to equal the scan rate of the logger. The same scaling can then be used for all scan rates.

# 3.0 INSTALLATION

The Wind Monitor Instrument is made of UV stabilized plastic with stainless steel and anodized aluminium fittings. All bearings are stainless steel precision grade. Instruments purchased from Unidata have been modified to include a different printed circuit board (Model 6533B-PCB) within the junction box (the original PCB, which has been removed from the instrument, is included).

## 3.1 Placement of the Instrument

It is usually wise to install the instrument away from or above anything which disturbs airflow. The R.M. Young manual states: "As a general rule, the air flow around a structure is disturbed to twice the height of the structure upwind, six times the height downwind, and up to twice the height of the structure above ground."

## 3.2 Mounting

The Instrument mounts on a standard one inch (1") pipe using a stainless steel band clamp. On the mounting post assembly, there is a junction box which contains electronic circuitry to convert the Instrument's output so that the logger can read it. Wires from the logger enter this box through a cable gland.

A second ring with band clamp, called an orientation ring, is provided so the instrument can be removed for maintenance and re-installed without loss of wind direction reference.

## 3.3 Grounding

It is essential to properly ground the instrument. This can be achieved by connecting the mounting post to a good earth ground. Either use a metal mounting pipe grounded in earth, or, if you use a mast or tower set in concrete, use grounding rods.

Alternatively, within the junction box, the terminal labelled Earth can be used to connect a good earth ground.

## 3.4 Connections

There are seven screw terminal blocks on a small printed circuit board (Model 6533B-PCB) inside a junction box on the mounting assembly. Each terminal is labelled. To connect the instrument to a datalogger, refer to the connections table below. You may use any analog channel for the azimuth signal, and any counter channel for the wind speed signal. However, the connections shown below are for a1 and c1 respectively.

| Terminal | Usage | Starlogger FTS | Prologger FTS |
|---|---|---|---|
| Earth | Connect to a good earth ground close to the instrument. | | |
| Micropower | constant voltage supply | 43 | 46 |
| Digital ground | logger common (ground) | 2 | 2 |
| Direction signal | analogue input channel | 36 | 36 |
| UPS/Power | 5V output power from logger | 15 | 55 |
| Wind speed signal | counter input channel (c1) or (C1) | 7 | 7 |

* Note: The Wind Monitor requires a constant voltage supply obtained through any counter channel on the FTS.

## 3.5 Wind Direction Output

The azimuth signal output varies between 0 and 2.5V, depending on the wind direction, ie, 0 is 0° and 5 is 360°. There is, however, a dead band of approx. 5° between 355° and 0°.

## 3.6 Using an RM Young Instrument Purchased Elsewhere

For instruments not purchased through Unidata, the printed circuit board must be changed with one manufactured by Unidata. Otherwise, the wind speed signal is not of a suitable voltage level. This circuit board is the same size and the wire connections are exactly the same. Therefore, changing one for the other is straight forward. The terminal blocks have similar functions except that the block labelled WS REF on the original PCB is now labelled BATTERY. This is now used to provide a constant supply for the electronics on the new PCB.

## 4.0 SPECIFICATIONS

**Model 6533A**

Wind Speed Range: 0-100 m/s (224 mph), 0-360°

Accuracy:

Wind Speed ±0.3m/s (0.6 mph) or 1% of reading

Wind Direction:±3°

Threshold:

Propeller 1.0m/s (2.2 mph)

Vane:1.1 m/s (2.4 mph)

Output signal:

8 or 16 bit counter channel. 3 pulses per revolution (0.098 m/s per Hz)

Interface Output signal:

1 analog channel, 0 to 2.50V FS calibrated. 0 to 359°

Power: 5VDC from logger

Operating Temp.: -50 to 50°C.

Size: 37cm x 55cm (HxL), Propeller Dia 18cm

Weight: 1.0kg

Mounting: 34mm dia pipe

**Model 6533LD**

Output signals: 4-20mA full scale

Power: 8-30VDC

Operating Temp.: -50 to 50°C