STARLOG

Wind Run Anemometer

Model 6503

User Manual Supplement
6227

Revision B
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1. INTRODUCTION

The Model 6503A & 65038 anemometers are designed to measure wind run in metres of wind passed near the instrument. The three cone anemometer head has been developed to provide a linear relationship between its rotational speed and wind speed.

Both anemometers will withstand winds up to 150 km/h (41.7 m/s) and Model 6503B has been specifically designed to operate at very light breezes of 2 km/h (0.5 m/s) or less.

Model 6503A counts every revolution and measures 1.25 metres each revolution.

Model 6503B also counts every revolution and measures 2.5 metres for each one,

Five metres of screened microphone cable comes attached with the instrument.

Service Life

The anemometers are able to withstand the effects of all climatic conditions through the use of resistant materials and components. Metals used are painted aluminium, stainless steel and nickel plated brass.

The bearing manufacturer advises that the bearings are packed for life with a light oil which contains oxidation inhibitors. The theoretical life at a temperature of 50°C and a speed far in excess of maximum anemometer speeds was calculated to be 15 years. An anticipated minimum service life of 10 years may therefore be assumed for this instrument. A felt dust seal is provided to fit over the shaft to exclude dust from the bearings.

Operation

The wind run measured can be recorded by a Data Logger using a 4-bit or 8-bit counter channel. An opening and closing of a glass encapsulated reed switch, actuated by the rotation of a small permanent magnet attached to the rotating shaft of the spinning cup wheel, triggers the data logger counter each revolution.

2. LOGGER CONFIGURATION

To use the Wind Run Anemometer with a STARLOG Data Logger, you will want to define a scheme which uses a Counter Channel and logs the accumulated total over the log interval. The Counter Channel you choose will need to be set to either 4-bit or 8-bit with a prescale value of 1: this section explains how to do this.

Once wind run data has been logged, the actual average wind speed is easily calculated.

2.1 Scheme Definition

STARLOG Software Version 2.0

Select the appropriate instrument from the list. The default channel is Counter Channel 0 (C0).

STARLOG Software Version 1.9 or lower

To create a scheme to operate these anemometers requires the user to defme a new transducer for either Counter 0 (C0) or Counter 1 (Cl).

The formula to use is: SCALE 0 TO 81918.75 (6503A)
SCALE 0 TO 163837.5 (6503B)

Units: metres

Print string: #####.#

Operation: log accumulated total over log interval

Number of bytes: 2

2.1.1 Log Interval

It is recommended that the wind run is accumulated over a log interval of 30 minutes to 1 hour. This makes it possible to average very low wind speeds.

2.1.2 Log Action

It is necessary to log the accumulated total over the log interval. In Version 2.0 you will want to move the cursor to the TOT coIumn in the C0 (or C1, if you are logging on Counter Channel 1) row.

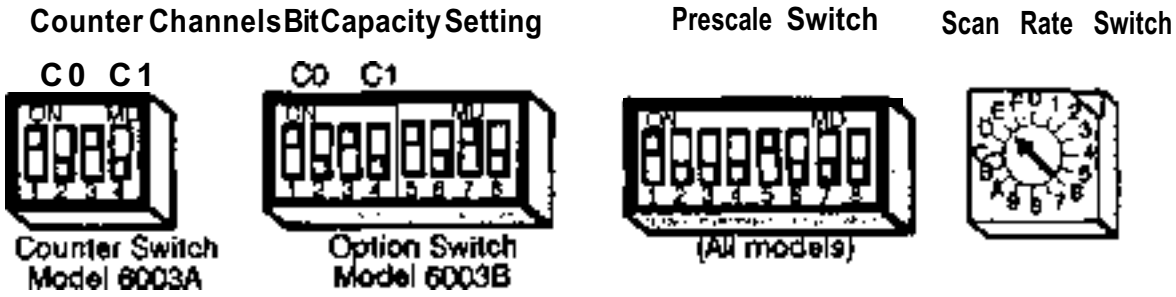
2.1.3 Formula

6503A (1.25 metres/rev):	scale 0 to 65535 x 1.25 ie, 0 to 81918.75
6503B (2.5 metres/rev):	scale 0 to 2.5 x 65535 ie, 0 to 163837.5

2.2 Switch Settings

The Scan Rate, Prescale and Counter switches on the Portable Data Logger must be set appropriately to use this instrument in a scheme.

These switches are shown below.



2.2.1 Scan Rate

The scan rate must be set in relation to the maximum wind run and the size of the counter. It must be set to ensure that no more than 15 pulses will occur in any one scan using a 4-bit counter (see the example on the next page).

Because one pulse occurs every revolution the logger must be set to scan at least every time the instrument revolves 15 times. With a 1 second scan rate, using Model 6503B, this is in speeds of up to 37.5 metres per second. (15 x 2.5 m/s) and using Model 6503A this is in speeds of up to 18.75 metres per second (15 x 1.25 m/s).

If it is impossible to guarantee less than 15 pulses per scan at the fastest possible scan rate, then it is necessary to use an 8-bit counter which allows up 255 pulses per scan to occur without error.

2.2.2 Counter Channel

You can use a 4-bit counter when

scan rate	Model 6503A	Model 6503B
1 second	18.75 m/s	37.5 m/s
10 seconds	1.875 m/s	3.75 m/s

If the wind run exceeds these figures, you must reduce the scan rate (if possible) or use an 8-bit counter.

2.2.3 Prescale Switch Setting

The prescale switch must be set to 1 (0001).

2.3 Calculating Wind Speed (metres per second)

Because the Low Wind Speed Anemometers only give one count per revolution, this count will be very low at the lower end of the range, eg, a speed of 0.5 m/s (with 6503B) will produce only one count every 5 seconds. If the scan rate was set at 1 second, then only one in five scans would read a pulse.

To alleviate this problem, the pulses should be totalised over an entire log interval. eg, in the previous example, with a scan rate of 1 second, speed of 0.5 m/s and log interval of 1 minute, 12 pulses (1 pulse every 5 seconds) would be accumulated over the whole minute. This is equivalent to wind run of 30 metres (12 x 2.5) in 1 minute.

ie, speed = 30 metres/min
= 30/60 metres/sec
= 0.5 m/s, the actual wind speed.

Thus, to determine an average speed in m/s you will want to divide the wind run (in metres) by the log interval in seconds.

3. INSTALLATION

Where ground surface wind is to be measured according to the Bureau of Meteorology standard weather station procedure, the height of 2 metres to the centre of the cups is achieved by using a length of 1" or 2" water pipe set into the ground. Use a reducing fitting at the mast top which provides a " B.S.P. water pipe female thread which will match the " male nipple of the anemometer base.

Screw the anemometer body to the mast head leaving cable in its coil until the mounting is completed. Ensure that the felt washer is in place before fitting the cup wheel.

Place the cup wheel in position so that the hole in the shaft will line-up with the fixing set-screw of the cup wheel and screw in tightly

4. CONNECTIONS

Connect the cable wires to the Data Logger as shown:

Colour	Function	PDL pin #	FTS terminal #
Red	Counter 0 or 1	11 or 12	9 or 7
White	Ground	23	8,10,14
Screen	Ground	23	8,10,14

5. SPECIFICATIONS

Signal Protocol

Model 6503A:	1 pulse every revolution 2.5 metres per pulse
Model 6503B:	1 pulse every revolution 1.25 metres per pulse
Resolution:	1.25 metres (6503A) 2.50 metres (6503B)
Maximum speed:	150 km/h (41.7 m/s)
Stalling speed:	less than 2km/h (6503B)
Service life:	10 years minimum
Cabling:	5 metres of multi-core microphone cable
Construction:	white painted stainless steel cones and arms nickel plated brass base
Fitting:	1" pipe thread (male) for fitting to pipe or flange base
Signals:	+ 5V DC ground and digital pulse output.
Channel Usage:	4-bit or 8-bit counter