WindObserver II (WindObserver FC) Ultrasonic Anemometer

User Manual

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WindObserver II (WindObserver FC) Anemometer

Contents

1. FOREWORD

Thank you for purchasing the WindObserver II (WindObserver First Class) manufactured by Gill Instruments Ltd.
The unit has no customer serviceable parts and requires no calibration or maintenance.
To achieve optimum performance we recommend that you read the whole of this manual before proceeding with use. Do **NOT** remove black "rubber" transducer caps.

Gill products are in continuous development and therefore specifications may be subject to change and design improvements without prior notice.

2. INTRODUCTION

The Gill WindObserver II (WindObserver FC) wind sensor is a very robust, lightweight unit with no moving parts, outputting wind speed and direction. The units of wind speed, output rate and formats are all user selectable.

The WindObserver II (WindObserver FC) is supplied with de-icing heating (recommended if icing is likely).

The WindObserver II (WindObserver FC) can be used in conjunction with a PC, data logger or other device, provided it is compatible with the RS422 output.

The output message format is configured in Polar, NMEA (0183 Version 3); Continuous output, other formats can be configured as detailed in Section 7 Message Formats & Options.

WindObserver II (WindObserver FC) may be configured using standard communications software on a PC. This is explained in Section 8 Configuring.

3. FAST TRACK SET-UP

If you are in a hurry to try out the WindObserver II (WindObserver FC), are familiar with Gill equipment, and coupling to a PC using RS422, go to the following sections:

Section 6 Installation

Section 7 Message Formats & Options

Section 8 Configuring

After you have successfully set up the WindObserver II (WindObserver FC), we strongly advise that you then go back and read the rest of the manual to ensure that you get the best results from the WindObserver II (WindObserver FC).

4. SPECIFICATION

Model	1390-PK-057
Measurement	
Output	1Hz
Parameters	UV, Polar, NMEA
Units	m/s, Knots, MPH, KPH ft/min
Averaging	Flexible 1-3600 seconds
Wind Speed	
Range	0 - 75m/s
Accuracy	±2%@12m/s and ±6%@75m/s (estimated to be confirmed)
Resolution	0.01m/s
Offset	±0.01m/s
Direction	
Range	0 - 359°
Accuracy	± 2°
Resolution	1°
Anemometer Status	Supplied as part of standard message
Starting Threshold	0.01 m/s
Dead Band Wind Direction	None
Power Requirement	
Anemometer only	20-30 V DC (50mA Average)
Heating - Optional	3A @ 24V AC or DC
Digital Output	
Communication	RS422, full duplex, network facility
Baud rates	1200, 2400, 4800, 9600, 19200, 38400
Formats	8 data, odd, even or no parity
Dimensions	
Size	405mm x 210mm
Weight	1.5kg (not including cable)
Materials	
External Construction	Stainless Steel 316
Environmental	
Moisture protection	IP66 (NEMA4X)
Operating temperature	-55°C to +70°C
Humidity	5% to 100% RH
Precipitation	300mm/hr
EMC	BS EN 50081-1: 1992 (Emissions class B) BS EN 50082-2: 1992 (Immunity) FCC class A
Icing	MILSTD810E Method 521.1 Procedure 1
Standards	Traceable to UK national standards
Site Calibration	None required. (See Section 10.6 Zero Wind Check)

5. PRE-INSTALLATION

5.1. Equipment supplied

WindObserver II (WindObserver FC) RS422 output and de-icing
and Installation kit (comprising a gasket and four Stainless Steel screws)
and WindObserver II (WindObserver FC) CD User Manual (this manual)
and Integrity Check Chamber (ICC) (Optional)

5.2. Installation requirements

Host system - One of the following:

- PC with an internal or external interface compatible with the RS422 output from the WindObserver II (WindObserver FC).
- Other equipment with I/O compatibility to the WindObserver II (WindObserver FC) option selected.

Software - One of the following:

- HyperTerminal (for Windows™ 9x and later), or Terminal (Windows™ 3.n), normally already installed on a PC.
- Other Terminal Emulation software packages

Cable and Junction box

To connect between the WindObserver II (WindObserver FC) and the host system. The unit is supplied with a 15m flying cable, requiring a mast mounted junction box (not provided) for onward connection.

See Section 6.4 for connection details

The flying cable must be retained with a cable tie within 150mm of the base of the anemometer.

Mounting Bracket

A mounting bracket is required (not provided) which will attach to the WindObserver II (WindObserver FC) via the four tapped holes in the base of the unit. Always ensure that the gasket supplied is fitted to the base of the anemometer.

It is important that the gasket supplied forms a watertight seal on the base of the anemometer.

In the event that the mounting bracket supplied by the customer is not flat or does not form complete support for the anemometer base; the customer must fit a mounting ring as shown in Figure 2a.

See Section 6.6 for mounting details.

6. INSTALLATION

Do NOT remove the black "rubber" transducer caps. Warranty is void if the security seal is damaged or removed.

All the time the WindObserver II (WindObserver FC) is not in its final location, it should be protected from damage by keeping it in the original packaging as long as possible, treating it as a delicate instrument.

6.1. Installation Guidelines

The WindObserver II (WindObserver FC) has been designed to meet and exceed the stringent standards listed in its specification. Operating in diverse environments all over the world, WindObserver II (WindObserver FC) requires no calibration or adjustment whatsoever.

As with any sophisticated electronics, good engineering practice should be followed to ensure correct operation.

- Always check the installation to ensure the WindObserver II (WindObserver FC) is not affected by other equipment operating locally, which may not conform to current standards, e.g. radio/radar transmitters, boat engines, generators etc.

  Guidelines –

  - Avoid mounting in the plane of any radar scanner – a vertical separation of at least 2m should be achieved.
  - Radio transmitting antennas, the following minimum separations (all round) are suggested
    - VHF IMM – 1m
    - MF/HF – 5m
    - Satcom – 5m (avoid likely lines of sight)
- Ensure the product is correctly earthed in accordance with this manual
- Use cables recommended by Gill, keeping the length below the maximum allowed (*See Section 6.3*) Where the cables are cut and re-connected (junction boxes, plugs and sockets) the cable screen integrity must be maintained, to prevent the EMC performance being compromised.
- Earth loops should not be created – earth the system in accordance with the installation guidelines. (*See Section 6.4*)
- Ensure the power supply operates to the WindObserver II (WindObserver FC) specification at all times.

Avoid turbulence caused by surrounding structures that will affect the accuracy of the WindObserver II (WindObserver FC) such as trees, masts and buildings. The World Meteorological Organisation makes the following recommendation:

- The standard exposure of wind instruments over level open terrain is 10m above the ground. Open terrain is defined as an area where the distance between the sensor and any obstruction is at least 10 times the height of the obstruction.

6.2. Bench system test

***Note**: Prior to physically mounting the WindObserver II (WindObserver FC) in its final location, we strongly recommend that a bench system test be carried out to confirm the system is configured correctly, is fully functional and electrically compatible with the selected host system and cabling (preferably utilising the final cable length). The required data format, units, output rate, and other options should also all be configured at this stage. If an Integrity Check Chamber (ICC) has been purchased refer to Section 9.6.*

6.3. Cabling

Cable type

A RS422 compatible cable should be used, with the number of twisted pairs matching the application.

Generic description – Twisted pairs with drain wire, screened with aluminised tape, with an overall PVC sheath. Wire size 7/0.2mm (24 AWG)

The table shows some suitable manufacturers' references; other manufacture's equivalents can be used.

Table 1

No. of pairs	Gill ref.	Belden ref.	Batt electronics ref.
2	-	9729	-
3	026-02660	9730	91030
4	026-03156	9728	91199
9	026-02663	8774	91009

Cable length

The typical maximum length at 9600 baud is 1km (3200ft), using the recommended cable. If any problems of data corruption are experienced (due to, for example, a high local electrical 'noise' level), then a lower baud rate should be used. Alternatively, a thicker or higher specification cable can be tried. *See also Section 6.1*

Cabling and junction box

The WindObserver II (WindObserver FC) unit is fitted with a flying 9 pair cable attached (15m long). This must be terminated in a suitable terminal box to IP66 or better, fitted with glands to prevent moisture ingress.

The cable type from the terminal box to the host system must be as specified above. If any cable is likely to be exposed to mechanical damage, it must be enclosed in a suitable conduit or cable tray. The cable must be securely fixed with cable clamps or equivalent, such that the cable is not under stress at the cable glands.

The gland area at the base of the WindObserver II (WindObserver FC) **should not** be directly exposed to moisture, as whilst the gland is sealed when mated, the anemometer is vented to air at the base to avoid pressure build up. If an IP66 rating is essential or the unit is mounted other than 'right way up' **use the gasket** provided in the mounting kit.

6.4. Connections

Important Do NOT join any of the cores of the cable together. Joining cores could damage the unit permanently. Any cores not used should be isolated.

Do NOT connect the unit's 0V, heating –ve or digital 0V to the screen or earth.

The screens of each pair are joined together inside the anemometer - these should be joined to the cable screen(s) of any further cable run. Avoid long grounding loops. Digital OV should be used in conjunction with RS422 TX RX lines in order to improve noise immunity. Each pair in the cable is labelled with its pair number.

Table 2

Conductor colour		Designation
Pair 1	green	RS422_TXB (+)
	black	RS422_TXA (-)
Pair 2	white	RS422_RXB (+)
	black	RS422_RXA (-)
Pair 3	red	Supply V+
	black	Supply V-
Pair 4	blue	Digital 0v
	black	Not used (isolate)
Pair 5	yellow	Heater +
	black	Heater –
Pair 6	brown	Not Used (isolate)
	black	Not Used (isolate)
Pair 7	orange	Not Used (isolate)
	black	Not Used (isolate)
Pair 8	white	Not Used (isolate)
	red	Not Used (isolate)
Pair 9	green	Not Used (isolate)
	red	Not Used (isolate)
Screens		Chassis ground

Earthing or grounding

To ensure correct operation, and for maximum protection against lightning, the anemometer **MUST** be correctly earthed (grounded) via its mountings. Inadequate Earthing will degrade anemometer performance, particularly in the presence of radio frequency interference.

See Fig 1 ***Suggested mounting bracket and Earthing (grounding) arrangements***

The unit **MUST** be connected to an appropriate grounding point with a minimum of 6mm² copper wire, via the M5 base screws. The cable screens must be joined with any cable screen continuing from the unit's cable via a junction box. The primary earth for the anemometer must be provided via the base screws and not via the cable screens.

Default Settings

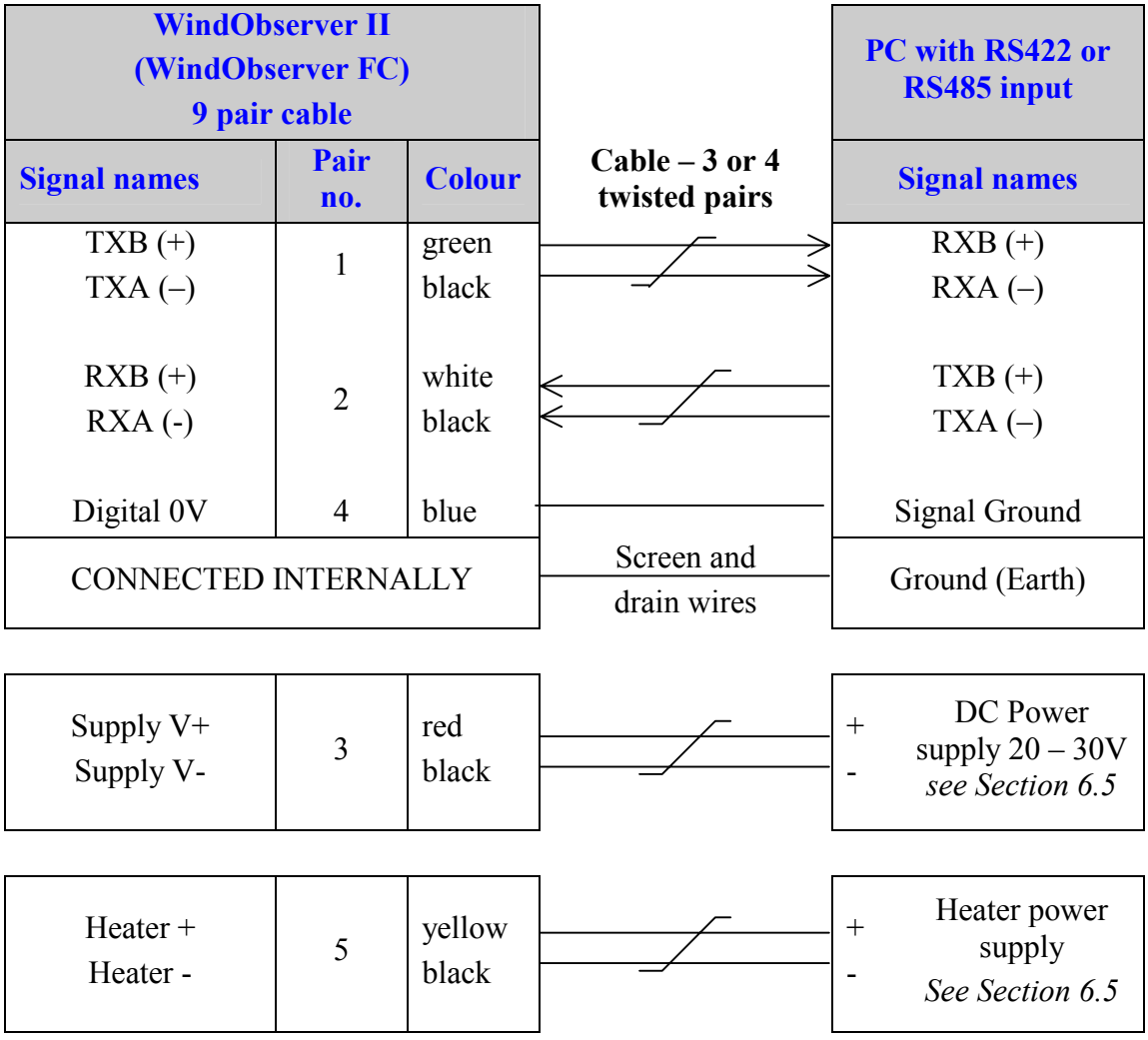
The factory default settings are:

A0 B3 C2 E1 F1 G0000 H2 J1 K1 L1 M5 NA O1 P1 T1 U1 V1 X1 Y1 Z6

See Section 8 Configuring for further details

Connecting to a PC with a RS422 or RS485 input

The PC requires either an internal RS422 interface card, or an external RS422/485 to RS232 converter, which will plug into the standard 9 way or 25 way RS232 serial port of the PC or host equipment.



6.5. Power supplies

All WindObserver II (WindObserver FC) units

Voltage	20 to 30v DC
Current	60mA max. 50mA average

Heating

The heating module requires a separate power supply.

Either

22 – 30V DC @ 3A

or 24V AC RMS ± 10% @ 3A AC RMS

NOTE: AC Supply must be isolated from Mains Supply

6.6. Mechanical installation

Before installing, a bench system test is recommended *(see Section 6.2).*

All the time the WindObserver II (WindObserver FC) is not in its final location, it should be protected from damage by keeping it in the original packaging as long as possible, treating it as a delicate instrument.

Location

It is important to ensure that the WindObserver II (WindObserver FC) is mounted in a position clear of any structure, which may obstruct the airflow or induce turbulence.

Do NOT mount the WindObserver II (WindObserver FC) in close proximity of high-powered radar or radio transmitters. A site survey may be required if there is any doubt about the strength of external electrical noise. (*See Section 6.1)*

Orientation

Normally the WindObserver II (WindObserver FC) is mounted vertically with the cable exit at the bottom.

Alternatively, the unit may be mounted in any orientation, but note that if the unit is mounted with the cable uppermost, the gasket provided in the mounting kit **must** be used.

Mounting bracket

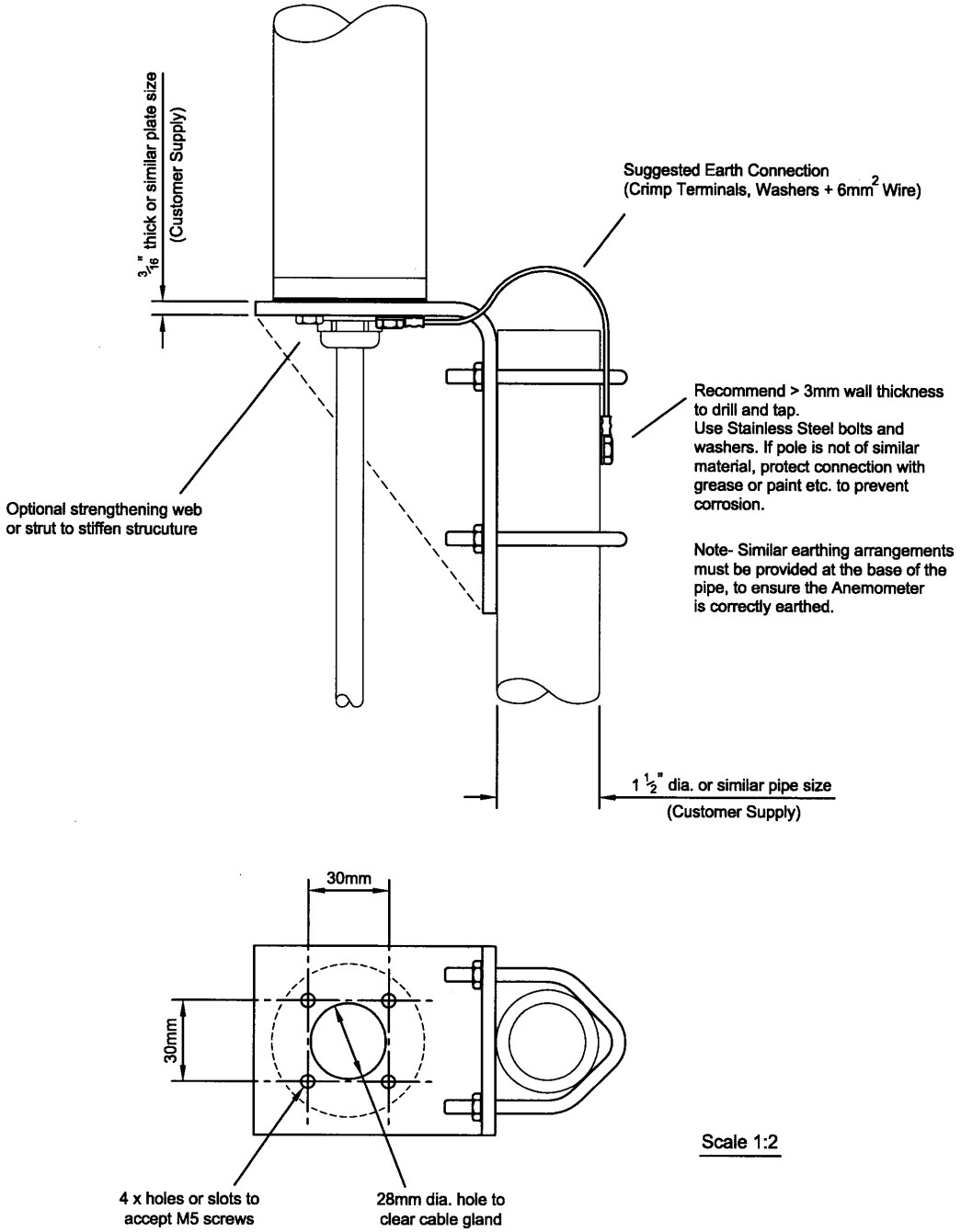
A suggested mounting bracket is shown in Fig 1 below.

It is recommended that the WindObserver II (WindObserver FC) mounting bracket is manufactured from stainless steel 316, to prevent possible galvanic corrosion.

It is also recommended that the supplied gasket is always fitted to ensure IP66 rating and to prevent galvanic corrosion if the mounting bracket is not manufactured from stainless steel 316.

Stainless steel 316 fixings must be used.

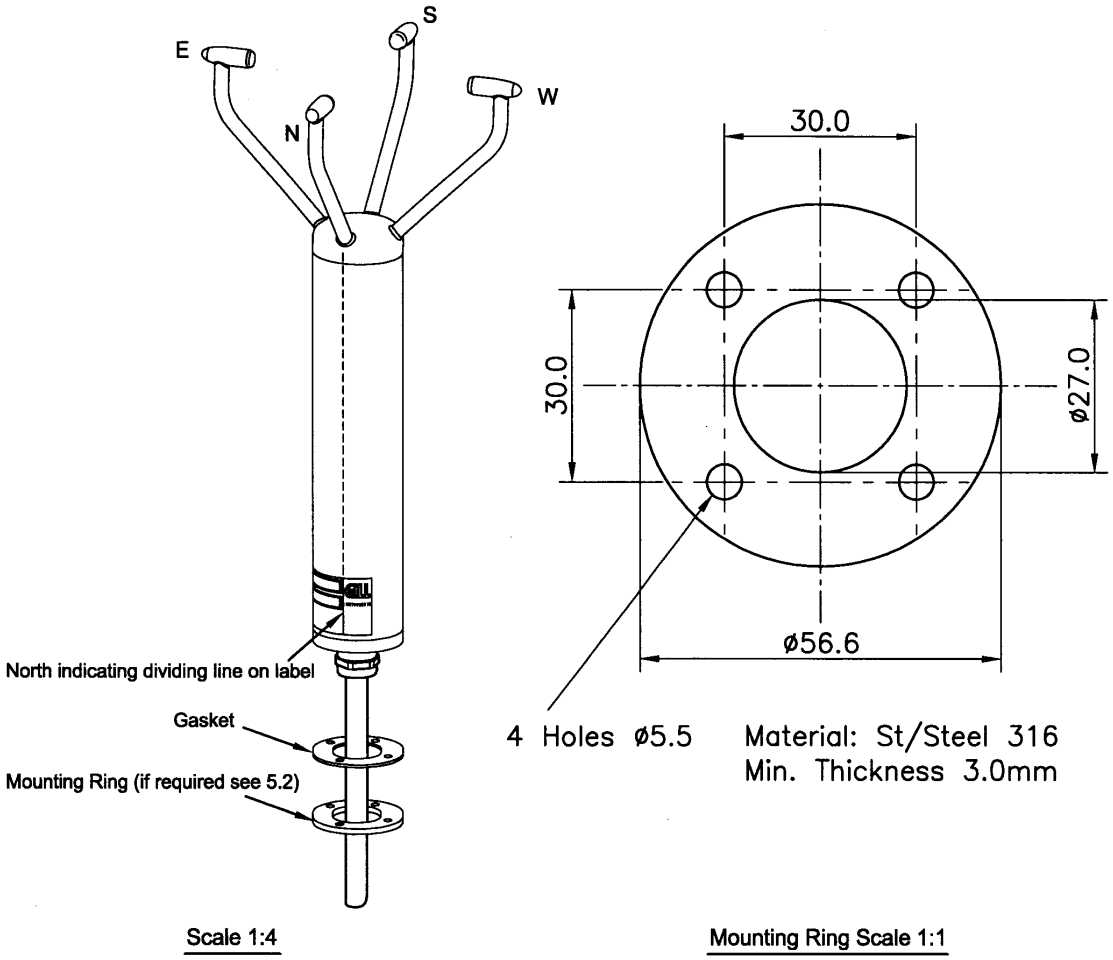
Figure 1. Suggested mounting bracket and Earthing (grounding) arrangements



Alignment

The anemometer should be set to point North (or to another known reference direction), using the North Spar, which can be identified from the alignment indicator on the base of the instrument. S*ee Figure 2a*.

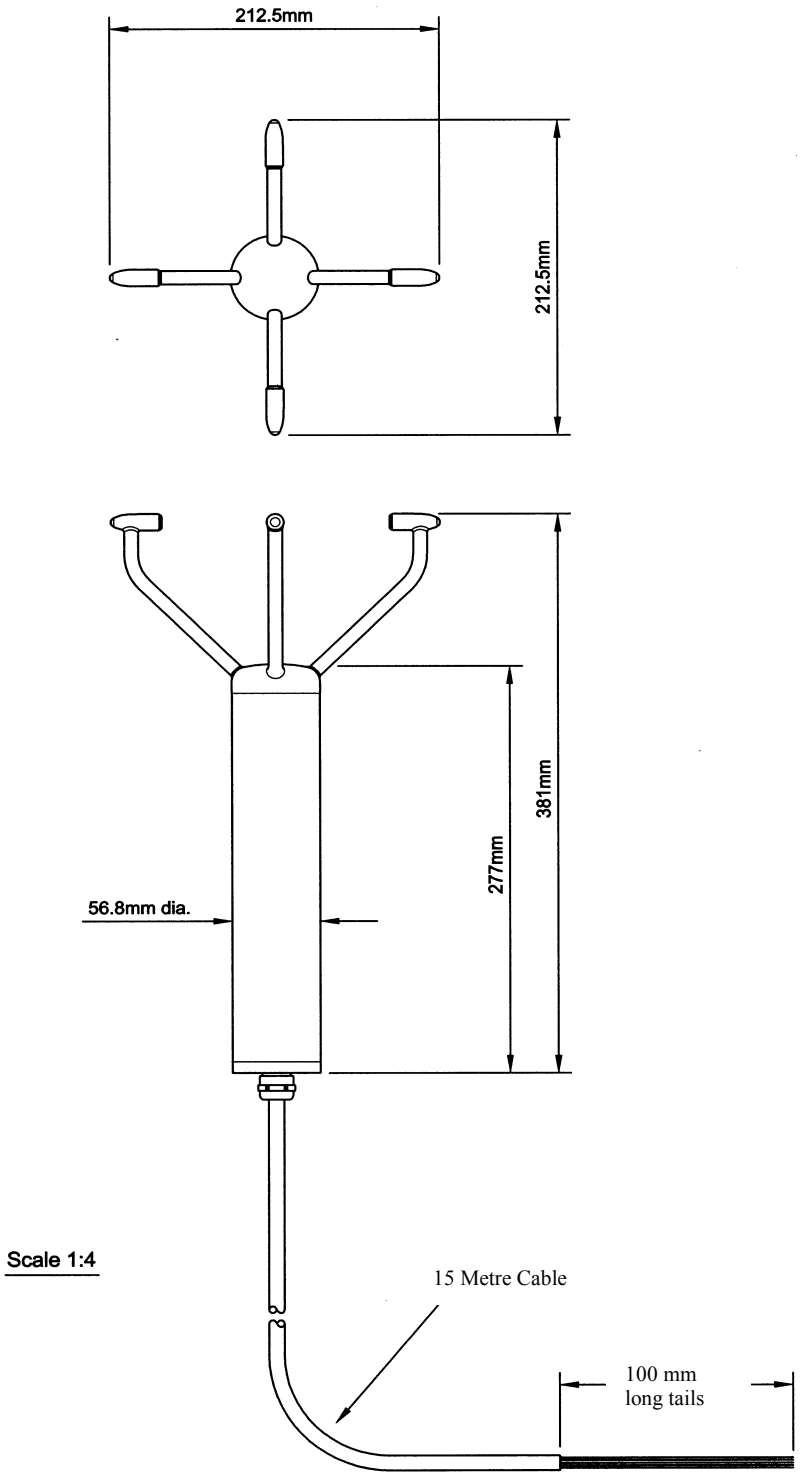
Figure 2a North marker and UV polarity definition (UV) format) and Mounting Ring



The North pointing spar of the unit is aligned with the dividing line between the silver and blue portions of the Gill Instruments Model and Serial No. label as shown above.

See Fig. 3, on page 24 for U,V DEFINITION

Figure 2b WindObserver II (WindObserver FC) Outline Dimensions.



Wind Observer II 2 Axis Anemometer Overall Dimensions

7. MESSAGE FORMATS & OPTIONS

On first applying power to the WindObserver II (WindObserver FC), it will be in 'Measurement Mode', and it will output wind measurement information in one of the configurations as described below.

Setting the output format, units, other parameters, options and the communication settings are all carried out in the alternative 'Configuration Mode'.

See Section 8 CONFIGURING for details of how this is done.

The factory default settings are shown here in **bold***, and for convenience some 'Configuration codes' (as used to set the configuration) are shown in blue boxes. For example* M3.

7.1. Wind Speed format

The wind speed measurements can be output in one of the following formats:

UV, Polar, Customer format NMEA.

7.2. Output formats

The UV and Polar wind speed parameters are output in NMEA format. These parameters can be transmitted continuously or polled from the user.

Polar is also available in continuous ASCII.

Output format		Output	Tri-state o/p	Configuration code
ASCII	UV	Continuous	No	M1
		Polled	Yes	M3
ASCII	Polar	Continuous	No	M2
		Polled	Yes	M4
NMEA		**Continuous**	**No**	**M5**

7.3. Units

The wind speed can be set to any of the following units:

Unit	Abbreviation
Metres per sec	m/s
Knots	knots
Miles per hour	MPH
Kilometres per hour	kph
feet per minute	fpm

7.4. Output rate

The output frequency is set to1 per second. The wind speed is sampled every 25ms, each axis being sampled sequentially. The following Table lists the possible outputs per second and the corresponding number of averaged samples. A 25ms sample period is used to process and output the results.

Outputs per Second	Sample Average
1	39

7.5. Averaging

The Averaging Period can be set from zero to 3600 secs. (1 hour). The default setting is zero**.** When averaging is enabled, data is output at a rate determined by the averaging period. The data is an average of valid data collected during the averaging period.

7.6. Heating

Heating is autonomous and requires no set-up once activated.

7.7. 45° Offset

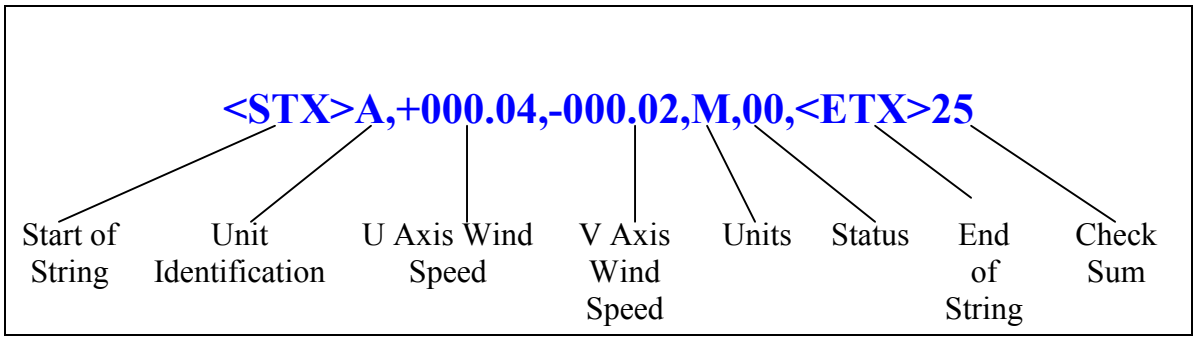
The U axis is offset +45° to the transducer axis.

7.8 Vertical Output Padding

A dummy W vector is inserted to provide compatibility with any WindMaster that may be in a network.

7.7. ASCII message format (UV and Polar)

ASCII UV format



Where

U axis wind speed In increments of 0.01 units (±UUU.UU)

V axis wind speed In increments of 0.01 units (±VVV.VV)

	Value	**Units**
Units	M	Metres per second (m/s)
	N	Knots (knots)
	P	Miles per hour (MPH)
	K	Kilometres per hour (kph)
	F	Feet per minute (fpm)

Start of string ASCII value 2

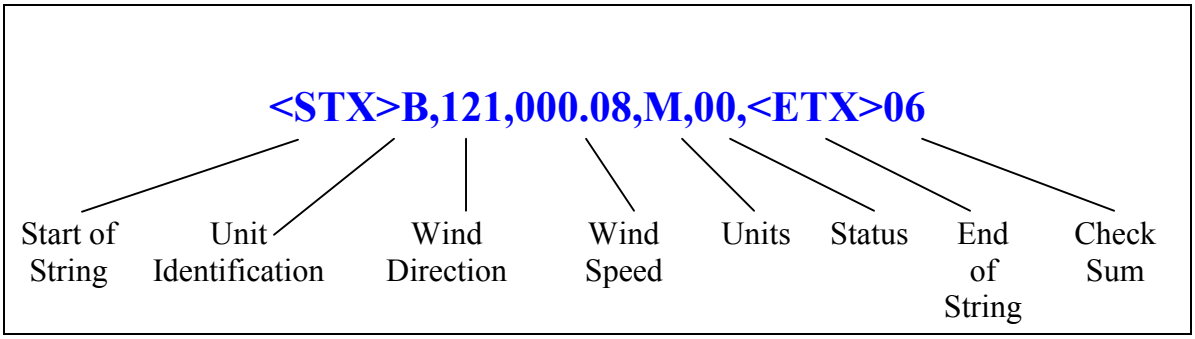
Unit identification Letter A – Z **(default A)**

Status	**Value**	**Status**
	0	OK
	60	Heating enabled and OK if enabled
	Any other value	Warning or fault condition *- see Section 9.5*

End of string ASCII value 3

Check sum Exclusive OR of all characters between Start of String and End of String reported as ASCII hex.

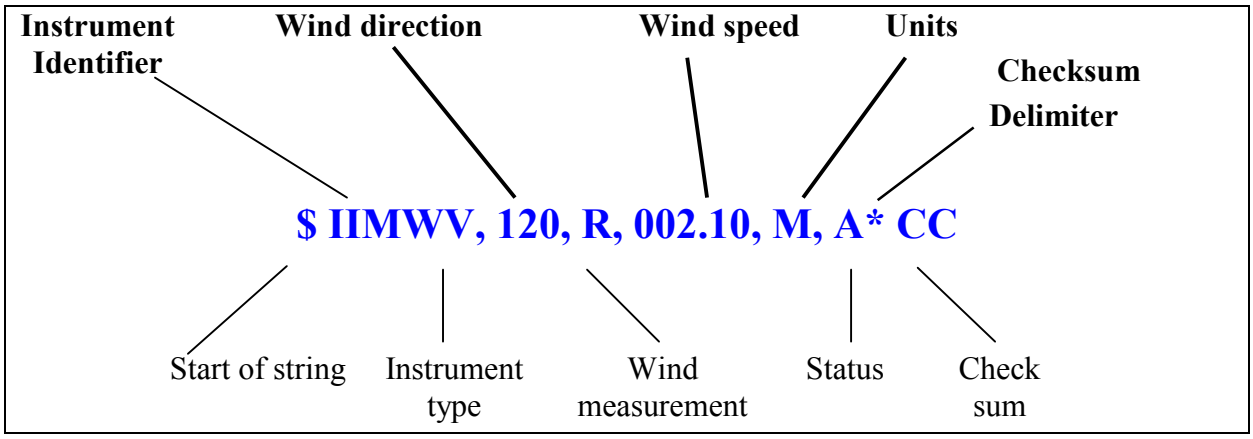
ASCII Polar format



Where

Wind direction	In degrees relative to N (DDD)
Wind speed	In increments of 0.01 units (±MMM.MM)
All other parameters	*See Section 7.7* ***ASCII UV format***

7.8. NMEA Format



Where

Wind direction	In degrees relative to N (DDD)	
Wind speed	In increments of 0.01 units (±MMM.MM)	
Units	M	Metres per second (m/s)
	N	Knots (knots)
	P	Miles per hour (MPH)
	K	Kilometres per hour (kph)
	F	Feet per minute (fpm)
Start of string	$	
Instrument type	IIMWV	
Wind measurement	R	Relative wind measurement
Status	A	Valid measurement
	V	Invalid measurement
Check sum	Exclusive OR of all characters between '$' and '*' reported as ASCII hex.	

The default WindObserver II (WindObserver FC) configuration suitable for NMEA is:

B3, E1, F1, G0, K1, L1, M5, O1, P1, U1.

Consult specification NMEA 0183 version 3 (available on the web) www.nmea.org for complete interface details.

8. CONFIGURING

WindCom may be used to configure WindObserver II (WindObserver FC). This is an easy to use menu-driven package, available as a free download at www.gill.co.uk .

Alternatively, you may use terminal emulator software such as HyperTerminal or Terminal.

This section describes the commands used to change settings when using terminal emulator software. *For a fuller description of the settings and options see Section 8 - Message Formats & Options*

Keystrokes are shown thus :- D 3 ENTER

8.1. Entering Configuration mode

From Continuous mode

*

From Polled mode

* N - where N is the Unit Identifier.

Note - the Unit Identifier must be entered as upper-case

The WindObserver II (WindObserver FC) responds with a CONFIGURATION MODE message, stops reporting wind measurements, and waits for a command (as detailed below).

8.2. Returning to Measurement mode

Q ENTER

If in **Continuous** mode, the anemometer responds with wind measurements immediately, continuing at the selected Sampling rate.

If in **Polled** mode,

?	Enables poll
N	Polls anemometer (where N is the Unit identifier entered as upper-case)
	The anemometer replies with a single set of wind measurements
&	Anemometer replies with Unit identifier
!	Disables poll

Note: - If the unit is in Polled Mode it is always best to interrogate the unit for data with a ? before the poll identifier to cater for the event that the power has been switched off or power interrupted.

8.3. Checking the configuration

We strongly recommend that, as a standard procedure, you use this command (D3) prior to, and after, changing any settings. It shows the current settings for all the alterable settings. We suggest you note down your settings, so that you can easily return to them.

	*	Enters Configuration Mode (from Continuous mode)
or	* N	Enters Configuration Mode (from Polled mode)
	D 3 ENTER	The WindObserver II (WindObserver FC) responds with the current settings.

The factory default settings are

A0 B3 C2 E1 F1 G0000 H2 J1 K1 L1 M5 NA O1 P1 T1 U1 V1 X1 Y1 Z6

How to change these settings is explained in the following sections.

To return to Measurement mode Q ENTER

8.4. Changing settings

To change a setting, first go into Configuration mode and then refer to the sections below. Enter the Configuration code of the new setting required, followed by ENTER.
If successful, the new setting will be echoed back as a message by the WindObserver II (WindObserver FC).

For example, to change the message format to ASCII UV Continuous, enter M 1 ENTER .
The WindObserver II (WindObserver FC) will reply with M1. When the unit is returned to the Measurement mode, it will be in ASCII UV Continuous format.

Note : The factory-set (default) settings are shown in **bold** in the following sections.

8.5. Output format

Output format	Configuration code
ASCII UV Continuous	M1
ASCII UV Polled (tri-state) *	M3
ASCII Polar Continuous	M2
ASCII Polar Polled(tri-state) *	M4
NMEA Continuous	**M5**

* If units are to be networked, they MUST be given unique Unit Identifiers
(see Section 8.6 Unit Identifier)

8.6. Unit Identifier

N X Changes the Unit Identifier to 'X'.
'X' can be any letter from B to Z.

Note that the default Unit Identifier A should not be used when networking units.

8.7. Units

Units	**metres/sec (m/s)**	knots (knots)	miles / hour (MPH)	kilometre/hour (kph)	feet / minute (fpm)
Configuration code	**U1**	U2	U3	U4	U5

8.8. Output rate

Outputs per second	**1**	2	4
Configuration code	**P1**	P3	P2

8.9. Averaging

Setting	Configuration code
Averaging (Default)	**G0000**

Enter the required averaging period in seconds as a four-figure number between 0000 and 3600.

8.10. Heating

Heating is autonomous and requires no set-up once activated.

Setting	Configuration code
Disabled	H1
Activated	**H2**

Each transducer is heated independently and will be active when ambient temperature drops below approximately +15ºC each transducer will de-activate when +25ºC threshold is reached.

8.11. NMEA

Setting	Configuration code
NMEA string "IIMWV"	**K1**
NMEA string "WIMWV"	K2

8.12. Vertical Output Padding

Setting	Configuration code
Disable vertical output padding	**V1**
Enable vertical output padding	V2

8.13. 45° Offset

Setting	Configuration code	Notes
Align U axis with transducer axis	X1	**X1. Aligns U axis with North/South axis.**
Align U axis +45° to transducer axis	X2	X2. This re-aligns both U&V and polarity 45˚.
Reverses Polar Direction	X3	X3 reverses reported polar direction to allow the instrument to be mounted upside down. N.B. Does NOT affect UV alignment (Mode 1, 3).
Align @ 45° from North	X4	X4 set UV & polar alignment at 45 degrees from North when instrument is mounted upside down.

Figure 3 shows the polarity of U and V if the wind components along the U and V axis are blowing in the direction of the respective arrows.

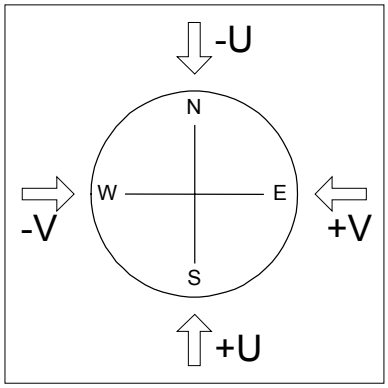


Figure 3 UV Polarity

8.14. Communications settings

Baud rate

Setting	Configuration code
2400	B1
4800	B2
9600	**B3**
19200	B4
38400	B5
1200	B6
300	B7

If a request is sent to change the Baud rate, before it changes it must be confirmed by entering B ENTER (at the new Baud rate.)

Eg. If set to B3 (9600 baud), to change to B5 (38400 baud), enter B 5 ENTER , change host terminal to 38400 baud, and confirm by entering B ENTER.

NOTE: a random echo will be generated after the B5 confirmation

Duplex mode

Setting	Configuration code
Full duplex	**E1**
Half duplex	E2

Note:- Refer also to Para 8.3 Networking Configuration details.

Data and parity options

Setting	Configuration code
8 bits, no parity, 1 stop bit	**F1**
8 bits, even parity, 1 stop bit	F2
8 bits, odd parity, 1 stop bit	F3
7 bits, no parity, 1 stop bit	F4
7 bits, even parity, 1 stop bit	F5
7 bits, odd parity, 1 stop bit	F6

ASCII Message terminator

Setting	Configuration code
CR LF	**L1**
LF	L2

Scaling

For output string information only, settings not applicable to WindObserver II (WindObserver FC).

Setting	± 10	±20	±30	±40	±50	±60	±70
Configuration code	Z1	Z2	Z3	Z4	Z5	**Z6**	Z7

Polar mode direction wraparound

For output string information only, settings not applicable to WindObserver II (WindObserver FC).

Setting	Configuration code
Wraparound (0 - 539°)	C1
Standard	**C2**

8.15. Configuration and Diagnostic Information

Each of these commands causes a response from the WindObserver II (WindObserver FC).

Item	Command code	Typical response
Type and serial No.	D1	E000694
Software version	D2	2.07
Unit configuration	D3	Current configuration: A0 B3 C2 E1 F1 G0000 H2 J1 K1 L1 M5 NA O1 P1 T1 U1 V1 X1 Y1 Z6
Anemometer power supply voltage	D5	+29.8
Integrity check	D6	

8.16. Message Format (Output String Padding)

Setting	Configuration code
Comma Separated Variable (CSV)	**O1**
Fixed Field	O2

Example data string for NMEA CSV data changing to error status code condition.

$IIMWV,092,R,000.58,M,A,*16

$IIMWV,000,R,,M,V,*19

Example data string for NMEA Fixed Field data changing to error status code condition.

$IIMWV,139,R,001.06,M,A*1C

$IIMWV,000,R,999.99,M,0E

9. MAINTENANCE & FAULT-FINDING

9.1. Cleaning

If there is any build up of deposit on the unit, it should be gently cleaned with a cloth, moistened with soft detergent. Solvents should not be used, and care should be taken to avoid scratching any surfaces. The unit must be allowed to defrost naturally after being exposed to snow or icy conditions, do NOT attempt to remove ice or snow with a tool.

Do NOT remove black “rubber” transducer caps.

9.2. Servicing

There are no moving parts or user-serviceable parts requiring routine maintenance.

Opening the unit or breaking the security seal will void the warranty and the calibration.

In the event of failure, prior to returning the unit to your authorised Gill distributor, it is recommended that:

- All cables and connectors are checked for continuity, bad contacts, corrosion etc.
- A bench test is carried out as described in Section 9.6.
- You contact your supplier for advice

9.3. Fault-finding

Symptom	Solution
No output	Check DC power to WindObserver II (WindObserver FC), cable and connections. Check comms settings of WindObserver II (WindObserver FC) (as detailed in Section 8 and host system match, including correct Com port Check unit is in Continuous mode Check that in-line communication devices are wired correctly. NOTE: It is usual for Anemometer TX + to be connected to converter device RX +
Corrupted output	Check comms settings of WindObserver II (WindObserver FC) and host system match. Try a slower baud rate. Check cable lengths and type of cable.
One way communication	Check wiring is in accordance with the manual.
Failed / Incorrect WindObserver II (WindObserver FC) output, data invalid flag	Check that transducer path is not blocked

9.4. Returning unit

If the unit has to be returned, it should be carefully packed in the original packaging and returned to your authorised Gill distributor, with a full description of the fault condition.

9.5. Status (error) codes

The Status code is sent as part of each wind measurement message.

Code	Status	Condition
00	OK	Sufficient samples in average period
60	OK and heating enabled	Sufficient samples in average period
A	**OK**	**NMEA data valid**
01	Axis 1 failed	Insufficient samples in average period on U axis
02	Axis 2 failed	Insufficient samples in average period on V axis
04	Axis 1 and 2 failed	Insufficient samples in average period on both axes
08	NVM error	NVM checksum failed
09	ROM error	ROM checksum failed
10	System gain at max.	Inaccurate results likely
50	Marginal system gain	Results OK, but marginal operation
51	Measurement average building	
62	Heating current tripped or electronic failure	
63	Thermistor open circuit	
65	Heating element open circuit	
V	NMEA data invalid	

9.6. Bench test

Couple the WindObserver II (WindObserver FC) to the host system and power supply, using a known working test cable.

Check that the unit is correctly configured by going into Configuration mode and using D3 *See Section 83 Checking the configuration.*

Check for normal output data, and that the Status Code is OK – 00, 60 or A (for NMEA format).

If the status code is other than these, refer to Section 9.5 Status (error) codes.

Use an office fan or similar to check that the unit is sensing wind, turning the unit to simulate changing wind direction and to check that both axes are functioning.

Note that this a quick functional test. There are no calibration adjustments; the unit is designed NOT to require re-calibration within its lifetime. Gill has provided and Integrity Check, see next page for details.

Integrity Check Chamber (ICC)

The software to perform the Integrity Check (IC) is incorporated in the latest WindObserver II (WindObserver FC).

The IC is designed to:

1. Identify any gross changes in the head geometry that would affect the performance.
2. Provide a zero wind environment to confirm the WindObserver II (WindObserver FC) zero calibration.

The ICC has been designed to be used in an indoor still air environment with an ambient temperature between 10°C and 28°C. When conducting the test it is important that the ICC is assembled on to the WindObserver II (WindObserver FC) head and not touched or moved during the test.

This test is only valid if undertaken with an ICC purchased from Gill.

Integrity & Zero Wind Check

Zero Wind Check

Configure your PC to run HyperTerminal and assemble the ICC by inserting the reflector cases and the two halves of the ICC onto the WindObserver II (WindObserver FC). The ICC must be retained using the strips provided. Then:

1. Ensure that the WindObserver II (WindObserver FC) is set in factory default mode. For Factory default settings see section 8.3.
2. Enter Measurement Mode and Record/View data

In still air wind speed measurements should not exceed 0.03m/s. If wind speed exceeds 0.03m/s contact Gill Instruments.

Integrity Check

Ensure the ICC is assembled correctly on the WindObserver II (WindObserver FC). Using HyperTerminal, enter Configuration Mode as described in Section 8.

Enter D6.

A typical report as shown below will be displayed.

```
ALIGMENT LIMITS: U=2417,2517
                 V=2369,2469
ALIGNMENT U:2467 *PASS*
ALIGNMENT V:2419 *PASS*
GAIN 0:0007 *PASS*
GAIN 1: 0007 *PASS*
GAIN 2:0008 *PASS*
GAIN 3:0008 *PASS*
D6
```

If there has been no significant changes to The WindObserver II (WindObserver FC) head configuration then *PASS* will confirm correct operation.

Alterations to the head geometry will result in a *FAIL* message. If this occurs please contact Gill Instruments.

10. APPENDICES

10.1. Glossary & Abbreviations

Item	Meaning
CAL	Calibration
CR	Carriage Return
CRLF	Carriage Return Line Feed
CSV	Comma Separated Variable
ENG	Engineering
ESC	ESCape key on keyboard used to stop any process that is being executed
ETX	End of string character
FAC	Factory
FC	First Class
fpm	Feet per minute
GND	GrouND
HEX	HEXadecimal
I/P	InPut
IP66	Protection Classification
KPH	Kilometres per Hour
LF	Line Feed
m/s	Metres per second
MAG	MAGnitude - scalar reference to wind speed
MAX	MAXimum
MPH	Miles per Hour
NEMA	National Electrical Manufacturers Association
NMEA 0183 (version 3)	National Marine Electronics Association standard for interfacing marine electronic navigational devices
No:	Number
NVM	Non-Volatile Memory
O/P	Output
PC	IBM compatible Personal Computer
PCB	Printed Circuit Board
POR	Power On Reset
PROCOMM	Terminal emulator software package
ROM	Read Only Memory
RS232	Communications standard

Item	Meaning
RS422	Communications standard
RS485	Communications standard
RTS	Request To Send
RX	Receive
RXD	Received Data
S/W	SoftWare
SOS	Speed Of Sound
SEC	SECond
STX	Start of string character
TERM	TERMinal
TX	Transmit
TXD	Transmitted Data
+VE	Positive
-VE	Negative
WindCom	Gill software used to configure WindObserver II (WindObserver FC)
WRT	With Respect To

10.2. Guarantee

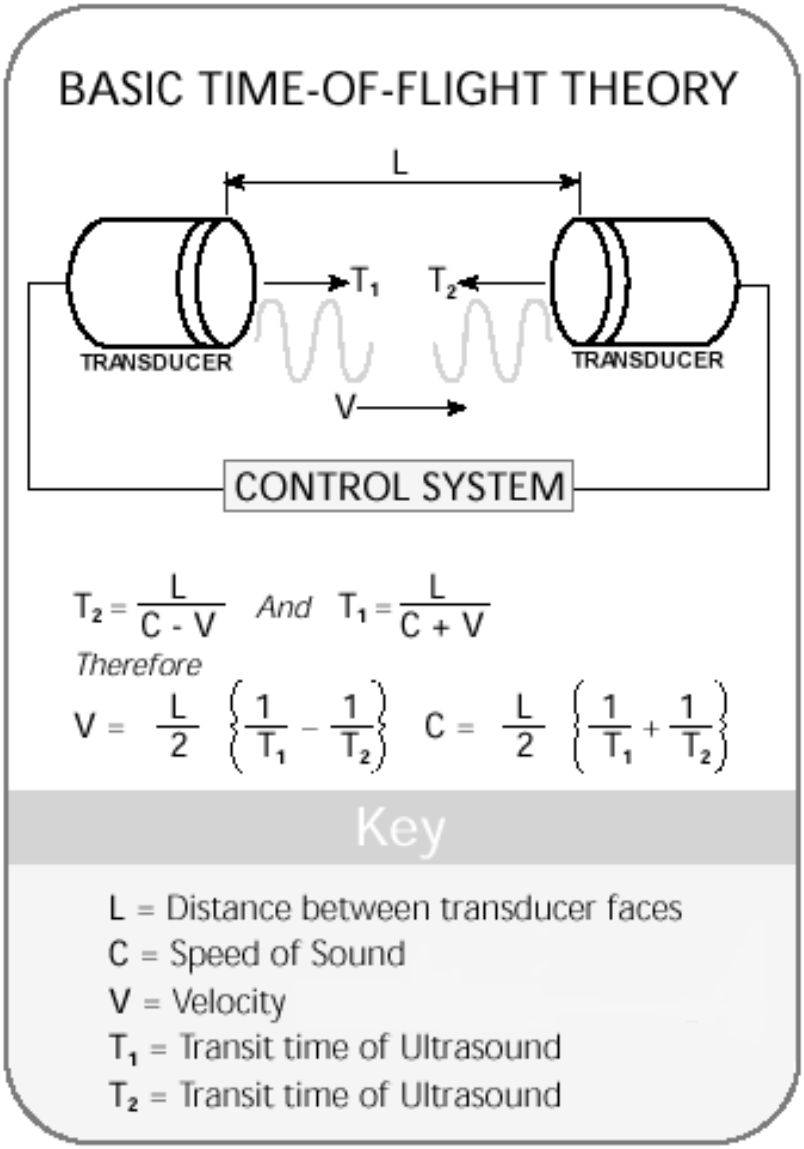
For terms of guarantee contact your supplier.

Warranty is void if the red security seal covering base nuts is damaged or broken, or the transducer caps have been damaged.

10.3. Principle of operation

The WindObserver II (WindObserver FC) measures the times taken for an ultrasonic pulse of sound to travel from the North transducer to the South transducer, and compares it with the time for a pulse to travel from S to N transducer. Likewise times are compared between West and East, and E and W transducer.

If, for example, a North wind is blowing, then the time taken for the pulse to travel from N to S will be faster than from S to N, whereas the W to E, and E to W times will be the same. The wind speed and direction (and the speed of sound) can then be calculated from the differences in the times of flight on each axis. This calculation is independent of factors such as temperature.



10.4. Electrical Conformity

EC DECLARATION OF CONFORMITY ACCORDING TO COUNCIL DIRECTIVE 89/336/EEC

We, Gill Instruments Ltd., declare our sole responsibility that the products:

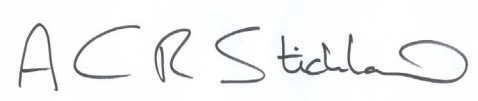
WindObserver II (WindObserver FC) Ultrasonic Anemometer (Heated Variant)

Manufactured by: Gill Instruments Ltd
Saltmarsh Park
67 Gosport Street
Lymington, SO41 9EG

to which this declaration relates, are in conformity with the protection requirements of Council Directive 89/336/EEC on the approximation of the laws relating to electromagnetic compatibility.

This Declaration of Conformity is based upon compliance of the product with the following harmonized standards:

EN50081 - 1	(Using EN55022 Class B)
EN50082 - 2	(Using IEC 61000-4-2
	IEC 61000-4-3
	IEC 61000-4-4
	IEC 61000-4-6)



Signed by:

A.C.R. Stickland – Director

Date of issue: 09/04/2007

Place of issue: Gill Instruments Ltd
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