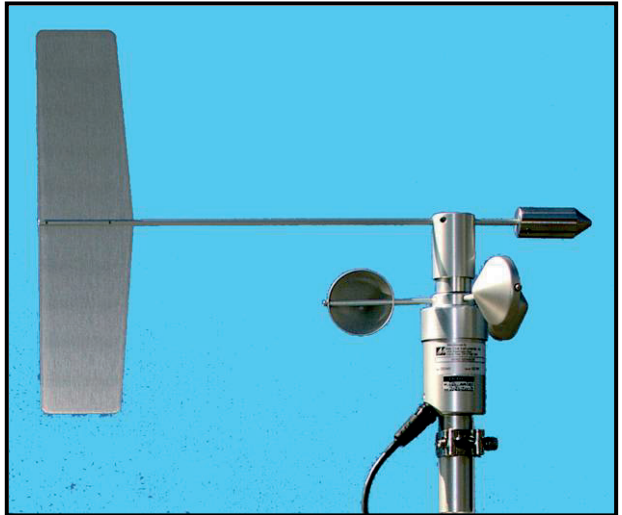


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User Manual for the

# **AN-WD2**

## ***Wind Sensor***



**AT**

AN-WD2 UM v1.0

***Delta-T Devices Ltd***

## **Notices**

### ***Copyright***

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### ***CE conformity***

Wind Sensor AN-WD2 as described in this document is only approved for EU use as part of the WS-GP2 Weather Station.

See also the following documents on the Software and Manuals CD and are also installed on your PC in the DeltaLINK, Document Library::

- WS-GP2 Weather Station EMC certificate.pdf
- WS-GP2 Advice.pdf

If the sensor is used with any other measuring equipment, it is the responsibility of the user to ensure the compliance of any such measuring systems.

### ***FCC Class A Device***

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### ***Design changes***

Delta-T Devices Ltd reserves the right to change the designs and specifications of its products at any time without prior notice.

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***13 May 2013***

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# Introduction

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## General Information

The AN-WD2 wind sensor measures the horizontal wind speed and direction.

Wind speed is measured by the rotation of a three cup anemometer which closes a magnetic reed switch at a rate proportional to the wind speed.

Wind direction is measured by a wind vane connected to a 10K potentiometer. A precision 3V voltage is supplied by the GP1 logger to give an output voltage proportional to the wind direction.

See also the following documents supplied on the Software and Manuals CD and in the WS-GP2 Weather Station Program documents folder installed on the users PC along the DeltaLINK PC program:

Met One 034B Operations Manual.pdf

Met One O34B Service.pdf

Product Summary.pdf

Example Calibration Certificate.pdf .

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## Scope of this Manual

This manual contains the specifications and performance of the AN-WD2 wind sensor.

See also the **WS-GP2 Quick Start Guide**.

# Installation

## Unpacking

Refer to the WS-GP2 Quick Start Guide

This sensor is shipped in its original packing for maximum protection and for use if returning the sensor for servicing.

Save all the wind sensor packaging. Use it to support the sensor during maintenance, and when returning it to the factory for servicing.

## Choose the Location

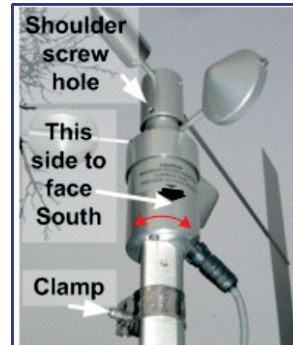
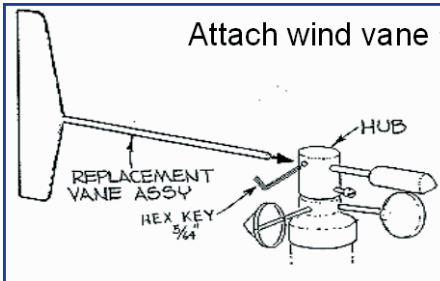
Refer to the WS-GP2 Quick Start Guide

## Installation

See the **WS-GP2 Quick Start Guide** for full installation instructions.

Once the wind sensor is properly installed and oriented as instructed, the hub locking screw is removed.

Save the shoulder screw, and use it to immobilise the shaft of the wind vane during transport.



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# Operational Checks

## Wind Direction Sensor Tests

Check the sensor via the real-time Sensors display in DeltaLINK - as described in the **WS-GP2 Quick Start Guide**.

Rotate the sensor clockwise as seen from above. The output should go from 0 to 360 degrees and restart at 0.

Note: In the air gap in the potentiometer between 356 and 360 degrees the GP1 Weather Station Program should indicate 358 degrees.

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## Wind Speed Sensor Tests

Spin the cups and observe the real time Sensors tab while running WS-GP2 Weather Station Program in DeltaLINK – as described in the **WS-GP2 Quick Start Guide**.

Testing the anemometer accuracy in the field is difficult without access to a calibrated wind tunnel. Check that readings are plausible, and if possible, compare them over a period of time against a reference anemometer of known provenance.

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## Inspection for Physical Damage

The AN-WD2 wind sensor should be inspected periodically for physical damage to the vane assembly and cable connections.

Inspect all vane assembly parts for security and damage.

Inspect the cup assembly for loose cup arms or other damage. The cup assembly cannot change calibration unless a mechanical part has loosened, or has been bent, damaged or broken.

Note that severe dust can eventually damage the bearings and this may affect the accuracy – see also the Maintenance Schedule on page 9.

# Specifications

## Wind Speed

Range: 0-75 m/s (0 - 167 mph)

Starting Threshold: 0.4 m/s (0.9 mph)

Accuracy :

$\pm 0.12 \text{ m s}^{-1}$  ( $\pm 0.25 \text{ mph}$ ) for wind speed  $< 10.1 \text{ m s}^{-1}$  (22.7 mph)  
 $\pm 1.1\%$  of reading for wind speeds  $> 10.1 \text{ m s}^{-1}$  (22.7 mph)

## Wind Direction

Range: Mechanical: 0-360°

Electrical: 0-356°

Starting Threshold: 0.9 mph (0.4 m/s)

Accuracy:  $\pm 4^\circ$

Damping Ratio: .25 standard (.4 to .6 optional)

Resolution:  $< 0.5^\circ$

## Output Signal

Wind Speed: Pulsed contact closure

Wind Direction: Voltage output : 0-3V = 0-356 degrees

## Temperature Range

-30° C to +70° C (Minimal icing conditions)

## Environmental

IP 54

Note the following explanation from the manufacturer:

“The IP rating on the 034B sensor is closest to 54. They are intended to run in rain, of course, and rain splashing from tower hardware (cross-arm, etc.) is not harmful. They are also intended to function in blowing dust conditions. Baffles minimize dust intrusion, but extreme blowing dust will shorten the life of the bearings. We recommend annual bearing replacement. However, experience has shown that in the most extreme dusty environments (constant high wind on a dry desert lakebed with very fine dust), the bearings may need to be replaced in as little as six months. Under actual conditions, even in normally dusty environments, dust intrusion is not a problem, and therefore the rating of 54

## Mounting

The sensor is mounted via an alignment hub and cross arm adapter to fit onto the M2 mast cross arm.

See also **WS-GP2 Quick Start Guide**

## Weight

Sensor Weight: 1 lb 12.5 oz (0.81 kg)

Shipping Weight: 4 lbs 3 oz (1.90 kg) Installation



# Maintenance

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## Maintenance Schedule

### 6-12 months

Inspect the sensors for proper operation .

See Operational Checks on page 6.

Replace the wind speed sensor bearings in extremely adverse environments.

### 12-24 months

Replace the wind speed sensor bearings

### 24-36 months

Return the whole sensor to Met One for a complete factory overhaul.

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## Replacement Parts and Service

Delta-T can supply a spares kit comprising a set of two replacement bearings and a reed switch assembly for the AN-WD2.

See Contact Details on page 12

### ***Met One service and parts***

A complete range of replacement parts and services are available directly from the manufacturer MetOne.

Full details of their services and part charges see **Service 034B.pdf**

For repair instructions see the Met One 034B Operations Manual.pdf.

Copies of these can be found as follows:

- on the Delta-T Software and Manuals DVD
- in the WS-GP2 Weather Station Program documents folder installed on the users PC along the DeltaLINK PC program
- online at MetOne.com

See Met One Contact Details on page 12.

# Warranty and Service

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## Terms and Conditions of Sale

Our Conditions of Sale (ref: COND: 1/07) set out Delta-T's legal obligations on these matters. The following paragraphs summarise Delta-T's position but reference should always be made to the exact terms of our Conditions of Sale, which will prevail over the following explanation.

Delta-T warrants that the goods will be free from defects arising out of the materials used or poor workmanship for a period of **twelve months** from the date of delivery.

Delta-T shall be under no liability in respect of any defect arising from fair wear and tear, and the warranty does not cover damage through misuse or inexpert servicing, or other circumstances beyond their control.

If the buyer experiences problems with the goods they shall notify Delta-T (or Delta-T's local distributor) as soon as they become aware of such problem.

Delta-T may rectify the problem by replacing faulty parts free of charge, or by repairing the goods free of charge at Delta-T's premises in the UK during the warranty period.

If Delta-T requires that goods under warranty be returned to them from overseas for repair, Delta-T shall not be liable for the cost of carriage or for customs clearance in respect of such goods. However, Delta-T requires that such returns are discussed with them in advance and may at their discretion waive these charges.

Delta-T shall not be liable to supply products free of charge or repair any goods where the products or goods in question have been discontinued or have become obsolete, although Delta-T will endeavour to remedy the buyer's problem.

Delta-T shall not be liable to the buyer for any consequential loss, damage or compensation whatsoever (whether caused by the negligence of the Delta-T, their employees or distributors or otherwise) which arise from the supply of the goods and/or services, or their use or resale by the buyer.

Delta-T shall not be liable to the buyer by reason of any delay or failure to perform their obligations in relation to the goods and/or services if the delay or failure was due to any cause beyond the Delta-T's reasonable control.

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## Service, Repairs and Spares

Users in countries that have a Delta-T distributor or technical representative should contact them in the first instance.

Spare parts for our own instruments can be supplied and can normally be despatched within a few working days of receiving an order.

Spare parts and accessories for products not manufactured by Delta-T may have to be obtained from our supplier, and a certain amount of additional delay is inevitable.

No goods or equipment should be returned to Delta-T without first obtaining the return authorisation from Delta-T or our distributor.

On receipt of the goods at Delta-T you will be given a reference number. Always refer to this reference number in any subsequent correspondence. The goods will be inspected and you will be informed of the likely cost and delay.

We normally expect to complete repairs within one or two weeks of receiving the equipment. However, if the equipment has to be forwarded to our original supplier for specialist repairs or recalibration, additional delays of a few weeks may be expected.

For contact details see page.12.

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## Technical Support

Users in countries that have a Delta-T distributor or technical representative should contact them in the first instance.

Technical Support is available on Delta-T products and systems. Your initial enquiry will be acknowledged immediately with a reference number. Make sure to quote the reference number subsequently so that we can easily trace any earlier correspondence.

In your enquiry, always quote instrument serial numbers, software version numbers, and the approximate date and source of purchase where these are relevant.

### Contact Details:

Tech Support Team  
Delta-T Devices Ltd  
130 Low Road, Burwell, Cambridge CB25 0EJ, UK  
email: [tech.support@delta-t.co.uk](mailto:tech.support@delta-t.co.uk)  
email: [repairs@delta-t.co.uk](mailto:repairs@delta-t.co.uk)  
web: [www.delta-t.co.uk](http://www.delta-t.co.uk)  
Tel: +44 (0)1638 742922  
Fax: +44 (0)1638 743155

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## Returns and Shipping Instructions

To minimise shipping costs, particularly for non UK customers, it is advisable to ship return sensors for service, repair and calibration directly to Met One

### ***Met One Contact Details***

Contact Met One direct for a Returns Number, quotation and terms and conditions and shipping instructions *before* you send the sensor.

Met One Service:  
1600 Washington Blvd., Grants Pass, Oregon 97526  
Phone 541/471-7111, Fax 541/471-7116

e-mail: [service@Metone.com](mailto:service@Metone.com)

# Trouble Shooting

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## Wind Direction Sensor

### **Symptom: incorrect reading**

#### **1. Check sensor wiring**

Check the wind sensor is correctly wired to the WS-GP2 logger.

#### **2. Check logger and software**

Check you have a WS-GP2 logger running the GP1 Weather Station Program and using the DeltaLINK3 or later.

#### **3. Check voltages**

With DeltaLINK running the weather station program in the real-time view, measure the voltages at the logger terminals with a voltmeter, with the sensor connected.

3.1 Measure the voltage between 3V (ref ) [white wire] and PGND terminal [white and brown wire]. It should be  $3V \pm 0.2mV$ .

3.2 Measure the voltage between the Wind Dir HI [yellow wire] and Wind Dir LO [green wire]. It should go between 0 and 3 V when the vane rotates between 0 and 356 degrees.

Note: In the air gap between 356 and 360 degrees the output Win Dir HI should be pulled up to +3V by a 1M resistor. The Weather station software interprets this as 358 degrees.

#### **4: Check the sensor resistance values**

4.1 Disconnect the wind vane wires from the data logger screw terminals and use an ohm meter to check the sensor resistance as follows.

4.2 Measure the resistance between yellow and green wires. The resistance should vary from about 1K to 11K ohms, depending on the angle.

#### **4: Inspect bearings**

If the wind vane does not rotate freely the bearings may need replacing.

Refer to the **MetOne 034B Operation Manual.pdf** and **MetOne O034B Service. pdf** for part numbers and information about their spares and repair and calibration service.

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# Wind Speed Sensor

## Symptom: incorrect wind speed

### **1. Check sensor wiring**

Check the wind sensor is correctly wired to the WS-GP2 logger .  
See the wiring in the **WS-GP2 Quick Start Guide**.

### **2. Check logger and software**

Check you have a WS-GP2 logger running the WS-GP2 Weather Station Program and using the DeltaLINK3 software.

### **3. Check the wind sensor switch**

Disconnect the wind speed sensor wiring from the logger.

Measure the resistance across the red [Wind Speed Signal] and black [Wind Sppeed GND] wires with an ohm meter.

Rotate the cup slowly. The resistance should jump from less than 1 ohm to infinity each time the switch opens.

### **4: Inspect bearings**

If the anemometer cups not rotate freely the bearings may need replacing.

Refer to the **MetOne 034B Operation Manual.pdf** and **MetOne O034B Service. pdf** for part numbers and information about their spares and repair and calibration service.